Products finishing

Volume 11 NOVEMBER, 1946 Number 2

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•

ROBERT I. SHORE
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•

Consulting and Contributing Editors

BRYANT W. POCOCK

H. LEROY BEAVER

ALLEN G. GRAY

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GEORGE E. HAY
Central-Western Manager
431 Main St.
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The Right Metal Cleaner

From the standpoint of the coating operator, the cleaning of the base metal prior to coating is one of the most important steps in the total process. It is a well recognized fact that the quality of coatings and finished coated products depends, to a great exent, on the cleanliness of the base to which the coatings are applied.

The multiplicity of metal cleaners available and the claims made for each may tend to create more or less confusion in the mind of the prospective user. The only fact vividly clear to the finish engineer is that the cleaner must produce a *metallurgically clean* surface on which to apply finishing materials, and must accomplish this result at a moderate unit cost. *Metallurgically clean* means the absence of any materials on the surface which will stimulate corrosion and interfere with the application of a coating, thus causing imperfection or failure of finish.

Coatings, whether they be metallic, organic, or special chemical treatments are applied for some specific purpose—the purpose generally being to give added protection and sometimes decoration to the base. Each type of coating material usually has fairly definite properties to the extent that for any standard unit of thickness a rather definite amount of protection may be expected. It follows then that if the most efficient use of coating material is to be made, certain requirements with reference to cleaning must be met and a definite scientific basis or "yardstick" must be established by which the finish engineer may gage cleaning requirements and balance them against the properties of the various cleaners available.

The finish engineer responsible for procuring cleaning materials should be familiar with the trade terms used to designate the different types of cleaners, as well as with cleaner composition and the effect that various cleaner components have on the cleaning job. A brief survey of plant storage and manufacturing practices will be very helpful in indicating, offhand, the type of dirt that will be encountered; that is, whether it be mineral oils, animal or vegeable oils, or combinations of these oils either alone or with other insoluble matter. Any of these types of dirt will require a specific cleaning process, with the cleaner modified to the type of dirt involved.

The final step in selecting a cleaner will be actual service tests. Seldom, if ever, is it possible to duplicate production cleaning in the laboratory. Any cleaner worthy of consideration is worthy of the slight additional expense involved in testing it under actual working conditions.

DURING the war years plating shops and manufacturing plants in Southern California were faced with the ever-present threat of having the gas they used for heating solution and cleaning water tanks, drying tunnels, enameling furnaces and heat-treating units shut off when the gas companies required such industrial gas for residential consumers.

The practice of the Southern California Gas Company and Southern Counties Gas Company, both of Los Angeles, which serve the Southern California area, is to supply industrial plants with gas only when they have available an extra or surplus amount, over and above that which is needed for domestic accounts. Such surplus industrial gas is sold to factories and shops with the understanding that it is subject to curtailment or complete shutoff if the demand by home owners makes such action necessary.

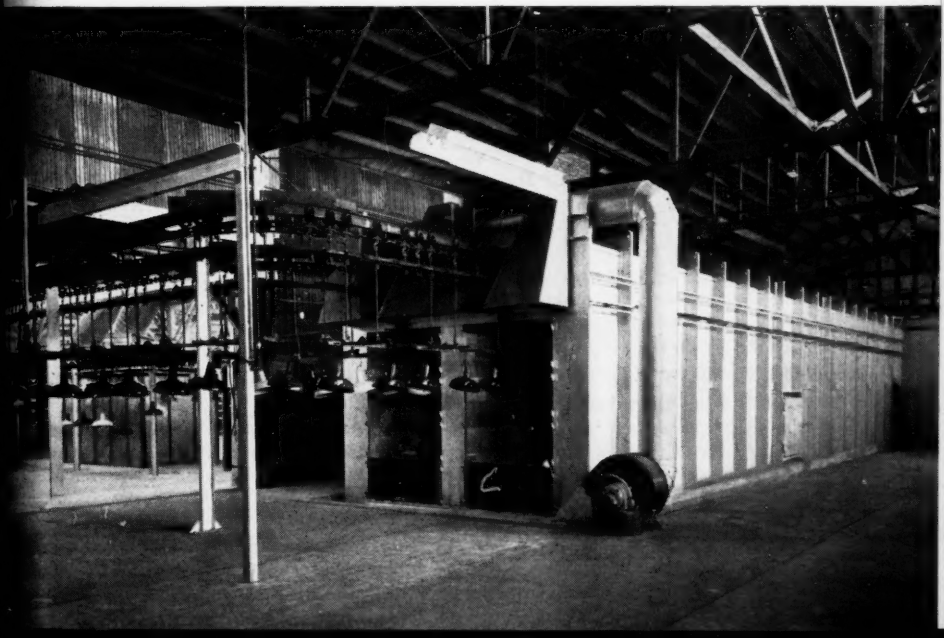
Wartime industrial expansion in the Los Angeles area resulted in a large population increase due to the influx of new workers. This upped residential gas demands so heavily that the gas companies were compelled to invoke the conditional clauses in many industrial contracts by curtailing gas supplies. Some factories and shops found their gas cut off for two or three months in a single year.

This situation was the actuating factor in the development of a dual industrial fuel system which now makes it possible for shops and factories to switch from gas to oil in emergencies by providing themselves with an oil stand-by or change-over device developed during the early part of the war and perfected in a series of plant operation tests during 1945 and 1946.

Dual Fueling in Pickling Plant

The development of the apparatus has created considerable interest in plating and metal deposition circles since the testing of the first devices of that nature was done during the past

Fig. 1—Continuous enameling furnace of the full muffle U-type which was recently installed by the Smoot-Holman Co., Inglewood, Calif., for handling porcelain enamel lighting and plumbing fixtures. Believed to be the world's largest of its kind, the furnace is gas fired except during periods of industrial gas shortage, at which time it is served by a switch-over oil-burning unit.



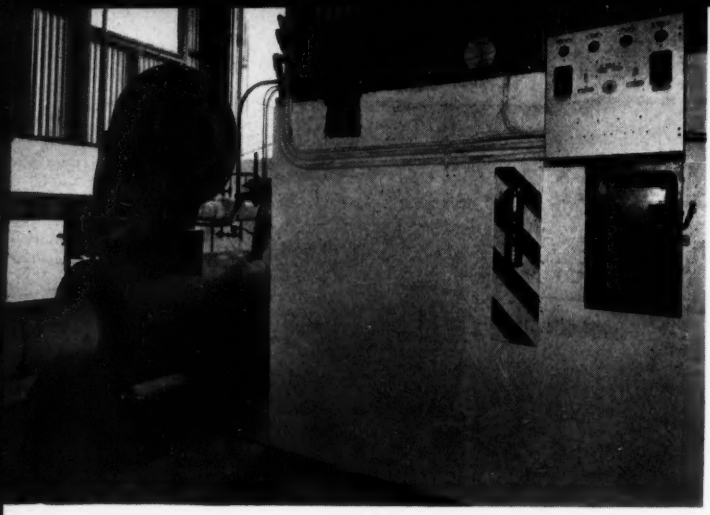


Fig. 2—Shown at the left is the stand-by Petr-O-Fire unit with which the enameling furnace shown in Fig. 1 can be changed from gas to oil burning in emergencies by flipping the switches on the panel board (upper right, on outer wall of enameling furnace) from "gas" to "oil" operation without recalibrating the controls.

year with dual fuel units hooked up as stand-by equipment for heating solution and cleaning water tanks, a deposition drying tunnel and a huge new gas-fired enameling furnace in the plant of the Smoot-Holman Co., Inglewood, Calif., manufacturer of porcelain enamel lighting reflectors and other parts of industrial illuminating systems, as well as plumbing fixtures.

Indicative of the fact that the gas shortage in Southern California has not been ameliorated by the let-down in war production is the new $70,000,000 pipe line which the two Los Angeles gas companies are at present constructing in collaboration with the El Paso Natural Gas Co., El Paso, Tex., to pipe natural gas from dry gas fields in the Texas Panhandle to the Los Angeles area. Surveys for the pipe line were only started in July and until the line is completed, industrial plants in Southern California are expected to be subject to periodic curtailment of their gas supplies.

Need for Stand-By Fuel System Seen

The man who first recognized the need for an apparatus with which the more amply available Southern California supplies of fuel oil or other types of petroleum products could be burned in place of natural gas during shortages of the latter fuel was Cloid Hammers, an industrial gas engineer for the Southern California Gas Company. The need for such an assistance fuel system was accentuated by the fact that the majority of shops and plants in the Los Angeles area are equipped to burn gas only in their furnaces and drying tunnels, for heating plating tanks, cleaning water tanks, pickling and drying tanks, and other production uses. Hammers attacked the problem from the standpoint of devising a method whereby oil, which normally burns as a long red flame, could be made to assume the flame and combustive characteristics of premix gas by burning in the form of a short blue flame typical of a premix gas flame.

Tested on Enamel Drying Tunnel

The technique which ultimately resulted in the development of the practical change-over unit now in operation in the Smoot-Holman Company's metal-finishing and enameling departments involves a compact setup which preheats oil to accomplish complete volatilization. Mixed with air in a venturi mixer, the resultant fuel-air mixture, when it reaches the premix

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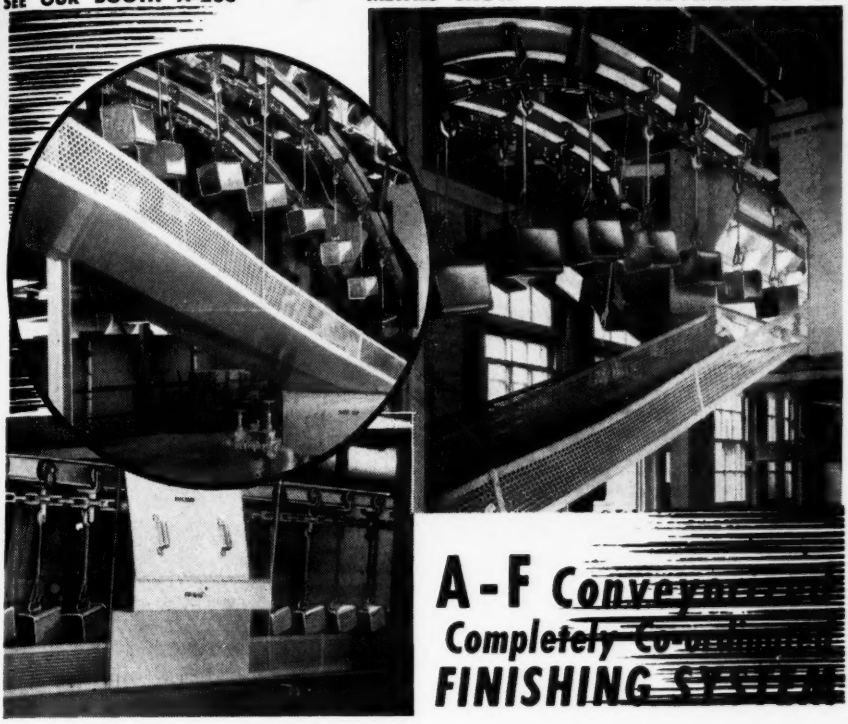

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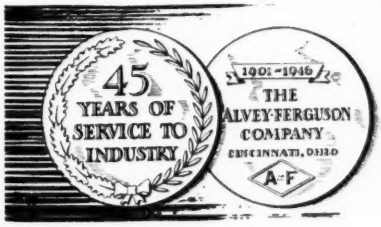

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Fig. 3—Smoot-Holman's arrangement of enamel spray booths is shown at the right in this illustration. The conveyor shown at the left is used to carry the enameled parts into a 60-foot-long drying tunnel in which the enamel is dried in 250 to 400-degree heat prior to passage of the parts into the enameling furnace.

burners under the solution or cleaning tanks, in the drying tunnels or in the enameling furnace, burns on the oil cycle with flame characteristics similar to natural gas flame characteristics.

Hammers has applied the name Petr-O-Fire to the apparatus. When the first experimental Petr-O-Fire was completed in 1945, Hammers prevailed upon the heads of the Smoot-Holman Company at Inglewood to test it in actual operation. Mindful of the curtailments which during the previous winter had deprived the firm of plant gas for some three months, Smoot-Holman officials readily agreed to have their plant serve as a testing ground.

The company operates a large gas-fired drying tunnel with a 60-foot-long drying chamber through which lighting reflectors and other parts, wet from the enamel spray booths and dip tanks, are carried on an automatic conveyor for drying prior to being sent through the enameling furnace. Since the firm at that time was preparing to install a huge U-type full muffle gas-burning enameling furnace, as illustrated in Fig. 1, the idea of participating in the development of a device that might serve to keep the furnace in operation during gas curtailment periods had a special appeal to the company's executives.

Switch-Over Heating for Acid Dip

At various times during the war, curtailments had caused temporary shutdowns of drying and enameling operations, as well as work in the metal processing department. When the first Petr-O-Fire unit had demon-

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strated itself as a practical and quickly functioning switch-over stand-by facility for the drying tunnel, Smoot-Holman had a second unit installed to serve the pickling, cleaning, rinse water and drying tanks. This unit is installed just outside the main door of the pickling department.

The installation has attracted considerable attention in Southern California metal-finishing circles. It has been inspected by owners of job-shop plating firms as well as by plant managers and production heads of large factories that operate metal-finishing departments in which the temporary lack of gas for solution and water tanks, heat-treating furnaces and enamel baking equipment would pose serious problems of interrupted production.

The simplicity of the mechanical operation of the device, the ease with which it can be switched from gas to oil-burning by the mere throw of a toggle switch and without recalibrating the instruments or controls, and the fact that various types of petroleum products (kerosene, stove oil, naphtha, distillates and other cheaper grades of gasoline) have been successfully used in it by the Smoot-Holman Company are factors which have won the attention of shop and factory managers.

Switch-Over Device Described

The third and most recent unit was installed to serve Smoot-Holman's U-type enameling furnace. The Petr-O-Fire is set up a few feet from the firing side of the 90-foot-long furnace. The unit illustrated in Fig. 2 is the one which serves the enameling furnace. The fundamental parts of the apparatus consist of a blower, installed above a cylindrical preheating chamber, a venturi mixer, zero gas governor and liquid fuel metering chamber.

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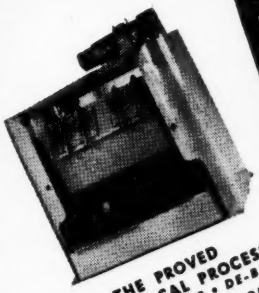

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comparable temperatures can be maintained in the muffle chamber of the enameling furnace up to 2,800 deg. on either the gas or oil cycle, with identical combustion and flame characteristics. A toggle switch on a panel board attached to the exterior of the furnace is marked "Oil Oper." on one side and "Gas Oper." on the other side. Other controls on the board are for the Mercoid switch, flame control, spark and pump pilots, blower and pump motors, main gas valves and spark coils.

To change over from natural gas to oil fuel, it is only necessary to turn the switch on the control board from "Gas Oper." to "Oil Oper." A solenoid gas valve opens and actuates a spark plug which ignites a gas burner in the air heater for heating the air delivered by the blower up to a temperature between 525 and 575 deg. F., passing subsequently into the venturi mixer. The natural gas fuel is then shut off from the proportional mixing chamber and is immediately followed by an injection of oil into the heated air stream, which becomes volatilized and mixed with the air. This fuel-air mixture is delivered through an insulated manifold to the point of firing in the enameling furnace, or the drying tunnel or the premix burners in the pickling and hot water rinse tanks. The burners are designed to burn premixed air and fuel.

The Smoot-Holman Company manufactures a wide range of metal products requiring enamel finishes. For nearly 30 years the firm has specialized in designing industrial and commercial lighting fixtures. It turns out large numbers of porcelain enamel reflectors, floodlights and fluorescent equipment, vaporproof lighting units and small parts.

World's Largest Enameling Furnace

As one of its major expansion steps, the Smoot-Holman Company installed what is believed to be the world's largest U-type continuous enameling furnace. Designed essentially for gas firing, the furnace is equipped with one of the three Petr-O-Fire units described above for emergency change-over to oil fuel. The furnace was designed and built by the Ferro

Fig. 4—Shown here is a portion of the automatic conveyor system in the Smoot-Holman plant on which enameled reflectors and other metal finished parts are transported from the enamel tanks and spray booths, through a drying tunnel, and then into the enameling furnace.

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Enamel Corporation of Cleveland, Ohio. It is 90 feet long and has a burning chamber measuring 18 feet 8 inches in length x 9 feet 3 inches in width x 7½ feet in height .

Including the preheating zone, the enameled parts travel a total distance of 160 feet. The furnace has a rated capacity of 7,000 cubic feet of gas per hour, but is usually held down to 6,000 cubic feet on high fire. The enameling section of the oven is designed to operate at 1,500 deg. F. when the parts are passing through on the conveyor. Temperature in the combustion tunnel is approximately 2,500 deg. Fahrenheit.

A heat seal is installed at the furnace entrance. Hot air is recirculated to prevent heat loss by drawing the hot air into ducts and returning it to the drying zone of the furnace.

Enamel Dip Tanks and Spray Booths

Smoot-Holman products are given their enamel coatings by the spray or dip method, depending on the size of the article. The deposit application equipment consists of six enamel dip tanks and six spray booths. The tanks have dimensions of 2 feet wide x 6 feet long x 1 foot deep. They are used for dip enameling reflectors and other parts which lend themselves to complete immersion. Company practice is to spray the third and final coating on all items, regardless of size.

The Smoot-Holman Company operates a large pickling department for pre-enameling preparation of the stamped steel, cast iron or aluminum base metal. The pickling and cleaning operations are conducted in a 25 x 25-foot room adjacent to the enameling and vitrifying departments. The pickling room is equipped with five large dip tanks and one drying tank, each measuring 4 x 4 x 10 feet long.

Pickling Room Facilities

Upon arriving in the pickling department from the stamping presses, the unfinished parts are placed in a Monel acid-resisting wire basket designed to fit easily into the tanks for complete immersion of the parts. The wire basket measures 30 inches in depth x 36 inches in width x 8 feet in length. An overhead hoist is used to lift the basket into and out of the tanks.

The tank facilities consist of the following, listed in the order in which the reflectors and other parts are immersed: a steel alkali solution tank for degreasing; a steel hot-water rinse tank; a wooden pickling tank containing a 7 per cent solution of sulphuric acid; a steel cold water rinse tank; and a steel soda dip tank.

From the soda dip, the basketed parts are hoisted into a dryer tank. This tank originally was equipped with burners for using gas only for heating purposes. Premix burners in the drying tank and immersion tube burners in the acid tank to keep the acid bath

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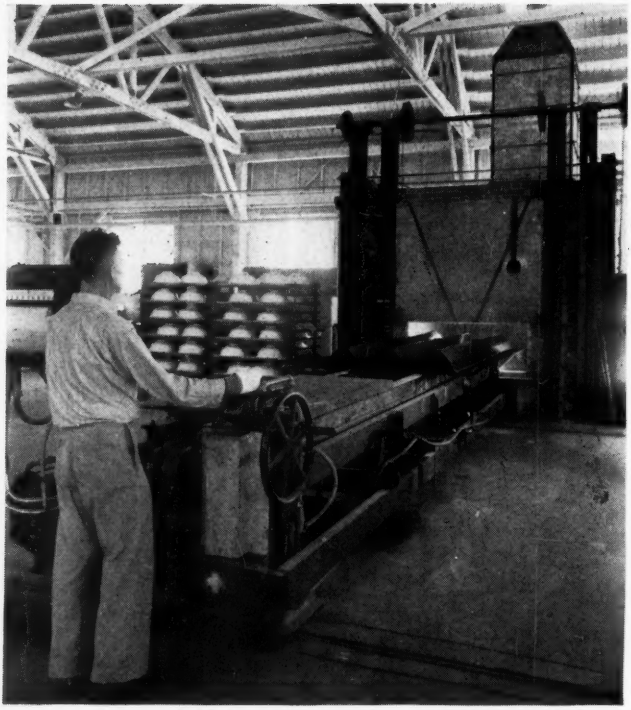

Fig. 5 — The Smoot-Holman Company utilizes two gas-fired porcelain enamel box type furnaces of the type shown herein to augment production at the U-type enameling furnace. Elongated reflectors of the type visible at the furnace mouth and smaller circular reflectors of the kind shown at the left background are shunted into the furnace with a Ferro charging fork (center).

at working temperature are now used. Both tanks can be switched from gas to oil fuel in emergencies by virtue of the Petr-O-Fire unit installed outside the door of the pickling room.

Apply Three Enamel Coatings

As shown in Fig. 3, the enamel spray booths and dip tanks are set up in the main factory area in which the drying tunnels and enameling furnaces are installed. The assembly-line principle of operations is employed by having the facilities installed so that the products move in sequential order from the stamping presses, to the heat treating department, then to the pickling department and finally to the dip tanks or spray booths.

A continuous conveyor moves past the booths and dip tanks, permitting the workmen to hook the enameled parts, after each of the three coating applications, to wire hangers on the conveyor which transports them, successively, through the drying tunnel and into and through the U-type enameling furnace.

The ground or first coating is applied by the dip or spray method, depending on the size of the part. The parts make a trip through the drying tunnel and furnace after each application of a coating, or three separate trips. The thickness of the enamel deposit depends on the size and type of the article and the characteristics of the base metal. The firm manufactures so many items of different size and shape that the citation of a typical deposit thickness would be difficult.

60-Foot Enamel Drying Tunnel

The drying tunnel operated in the Smoot-Holman plant was also originally intended for the exclusive use of gas fuel. The tunnel is 60 feet long and 8 feet high and wide. The parts moving through on the conveyor for

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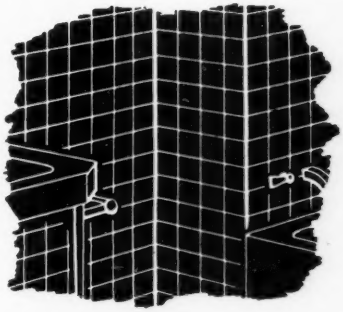

APPLICATION:

One coat primer followed by *one* coat of finish. (Additional coats of finish may be used when desired.)

BAKING TIME:

Primer: 15 minutes at 250° F. or air-dried overnight.
Finish: 30 minutes at 250° F.

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drying of the enamel are subjected to heat ranging from 250 to 400 deg. F. When the drying tunnel is being operated on the oil cycle, the Petr-O-Fire unit which is set up outside the entrance to the tunnel fires directly into the plenum chamber.

The speed of the conveyor is geared to the time the different parts must be kept in the enameling furnace. As shown in Fig. 4, the conveyor moves continuously past the dip tanks and spray booths, through the drying tunnel and through the furnace. The fizzure quality of the steel base metal and the thickness of the enamel deposit determine the length of furnace time. Enameled stamped steel items are allowed a total furnace time of 20 minutes of which 3½ minutes is in the firing zone. Cast iron items are given a somewhat longer furnace time.

The Smoot-Holman Company finds it economically impractical to shut down the furnace completely when production is temporarily at a standstill in the plant. It would take three days to cool the furnace down and another full day to reheat it to working temperature. For that reason, the fire is never extinguished and the furnace is kept burning at a reduced temperature of about 1,400 deg. F. when not in actual use as compared with 2,500 degrees when working.

Two Enamel Box Furnaces

Smoot-Holman also operates two gas-fired enamel box furnaces of the type shown in Fig. 5 to supplement production at the U-type furnace. These are fired with gas exclusively and have no stand-by oil fueling units. They are the product of the Ferro Enamel Corporation and were designed and built to Smoot-Holman needs. They are classified as Alundum V-bottom natural gas-fired box type furnaces with 5 x 12-foot hearths and automatic remote control facilities, and are served by an air-operated charging fork with which the parts are shunted into the firing chamber.

As a result of the successful operation of the dual firing systems in the Smoot-Holman plant, a number of similar units have been installed in other Southern California metal processing and enameling factories. The U. S. Porcelain Enamel Company has installed two Petr-O-Fire units as auxiliary fuel systems in its Los Angeles plant. Pacific Wire Products Company of Los Angeles has installed one in its metal processing department. O'Keefe & Merrit Co., Los Angeles, recently completed installation on a Petr-O-Fire for use in connection with a drying tunnel used for drying enameled gas range and oven sections. The Metlox Manufacturing Co., Manhattan Beach, Calif., the American Ceramic Company and Ceramic Decorating Company of Los Angeles are among firms which use the dual firing unit for stand-by firing of annealing ovens, pottery and glass kilns.

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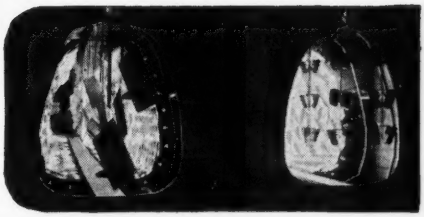
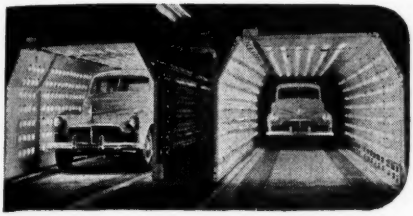


Drying finishes on various shapes of metal parts. (Photo courtesy Fostoria Pressed Steel Corporation, Manufacturers of Infra-Red Equipment.)



. . . to jobs like this

Touch-up drying of prime coats on automobile bodies. (Photo courtesy C. M. Hall Lamp Company, Manufacturers of Radiair Infra-Red Ovens.)

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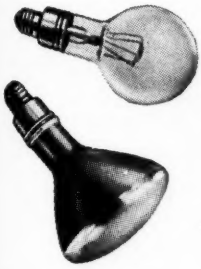

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Barrel Finishing of Metal Products

Part 3—A Discussion of the Care, Maintenance and Reclamation of Steel Burnishing Materials

By H. LEROY BEAVER
Barrel Finishing Consultant
Lansdale, Pennsylvania

WHEN we suggested just two months ago that readers of the current series of discussions on barrel finishing might submit their problems for solution to this division of the editorial department, we were not prepared for the type of difficulty that might first arise. Originally, the planned layout for this month was a continuation of the discussion of factors in the selection of barrels. Now this will have to be deferred for a time to provide for the current discussion.

Here are a few of the present crop of questions: "Our work seems to come from the barrel with a dull and listless look." "We were out of production on that part of our line that we barrel finished and now we find that our steel balls had rusted. We washed them off in gasoline and removed all the rust, but we cannot get satisfactory finishes." "Our burnishing balls were carefully stored in crocks and kept covered with a solution of cream of tartar water in the proportion of 4 oz./gal. but the results we get are really bad. What can you suggest might be our trouble?" "We kept our burnishing balls in cans covered with soapy water, but through neglect the water evaporated and the top layer of balls is now rusted badly. Must we throw them away and buy new material?"

All of the above quotations from letters come from concerns who have been more or less inactive throughout the war production period, but they could only possibly represent very few of those who have this trouble with defective or deteriotated burnishing material. This matter of reclamation and maintenance is especially important right at the moment for the reason that in most cases the best delivery promises that can be had from manufacturers of burnishing balls and burnishing shapes is from four to eight months, and every manufacturer that we know of has such a terrific backlog of unfilled orders that we doubt whether many of the orders now on file could be filled within the four to eight months as promised.

The proper maintenance of the steel burnishing material is one of the very important factors that must be scrupulously attended to if continuous satisfactory finishes are to be obtained. We will therefore first discuss the most prevalent cause of defective steel burnishing material and the one with

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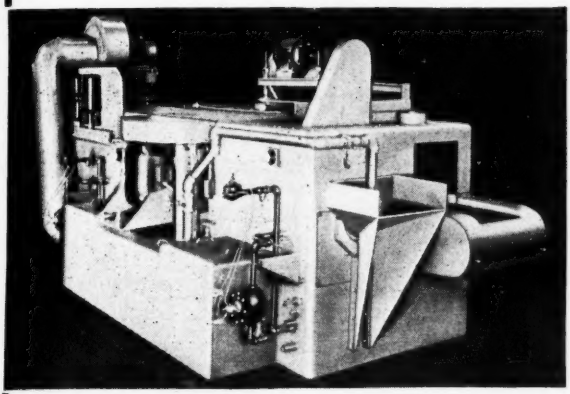

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which we come into contact most frequently in our various comings and goings; namely, rust.

Any highly polished steel burnishing materials should never be left to stand any length of time exposed to the air, whether they are wet or dry, because the attacks of rust come so quickly as to be at times almost unbelievable, and once material has rusted, it is always unsatisfactory for use until after it has been reconditioned. Before we discuss the actual reconditioning process perhaps we had better explain just how a burnishing ball is made. We have, of course, the two halves of the die which forms the ball blanks from

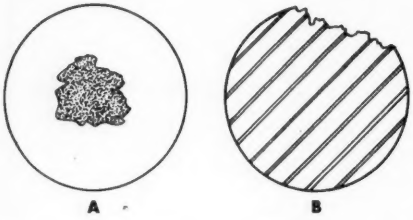

Fig. 1—This illustration shows the effect of a rust spot on a burnishing ball.

steel wire delivered by an automatic feed that feeds a sufficient length of stock so that when sheared off and passed to the die it will form one ball. As the dies close, this steel slug, as it is called, is upset and at the closure point of the die a ridge or flange of metal is formed around the equator of the ball. At each end of the ball that we call the poles, a small disc of the end grain of the wire slug is exposed since the skin of the wire never folds down completely over the poles of the balls. As a second step in production, the ball blanks are passed through automatic filing machines and the flange or fin around the equator is literally filed off, leaving an end grain exposure here as well as at the poles, and it is at these points that rust occurs.

It is bad enough to have a load of burnishing materials, whether balls or shapes, become rusted either through accident or neglect, but it is even worse to undertake to use such rusted material and expect satisfactory burnished finishes. Burnishing materials, loaded into the barrels with shovels, often wider than the barrel opening, are tricky things to handle and especially so when the operators hands are covered with a film of soapy water, and for that reason shovelful after shovelful of material is spilled on the floor. Sometimes these spilled balls are not completely gathered up when spilled and those that are salvaged later, and almost invariably rust pitted, are just tossed into the barrel along with the good material and thereby the entire mass is leveled with rusty material and satisfactory results are practically impossible.

It is well enough to say to us "We washed off all the rust with gasoline, and the material looks bright," but that is not enough. It must be remembered that every rust spot that appears on the surface of a ball represents a pit in the surface and while it it true that you can remove the oxide stain with gasoline, what of the remaining pit on the surface of the ball? Let us try to help you visualize it somewhat after this manner.

Fig. 1 shows two circles each representing the same ball. At **A** the ball is shown with a rust spot on the surface which is jagged and irregular as such spots generally are. Now let us look at **B** which is the same ball sliced in half and we are looking at the cross section directly through the center of the rough spot. You will notice that the edges and projections left by the rust spot are just as clean and sharp as the serrations on a new file, and knowing that it is not difficult to understand what happens to parts in process. It is not necessary to have an entire load of material become rusty, for

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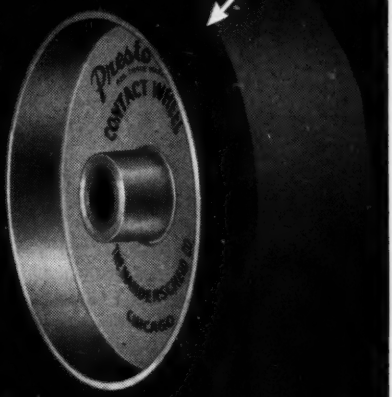

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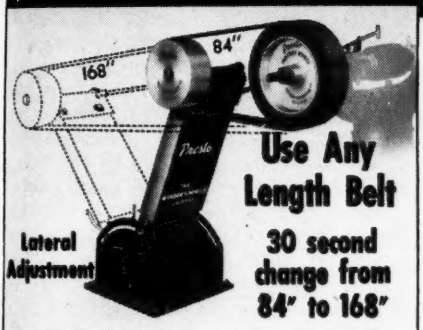

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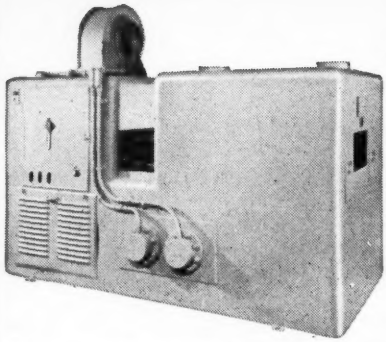

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even a very small proportion of such rust pitted balls will be quite sufficient to defeat the securing of the most satisfactory barrel finishing results. It is easy enough to say, "Well its quitting time and I won't bother to put that tray of balls back in the barrel, but I'll attend to that first thing in the morning," and that is just enough time to have rust cast spread all over the surface of the exposed materials and ruin them for all satisfactory results.

Then there is a third common practice that results in pitted balls. We think we know the reason and will give you our theory of it. It has always been assumed that if balls were left in the barrel and kept covered with soapy water that they would remain in perfect condition. This does not hold true because we know of cases where balls kept in this way turned out after a considerable period of such storage to be badly pitted. Did you ever see a worn liner taken from a barrel and did you notice the layer of muck and scum back of the old liner? Our theory is that this accumulation, which might be the worn leftovers of greasy soap base after the alkali had been exhausted, coupled with greases and other materials carried into the barrel through improper cleaning, contributes to this mass. Sooner or later such a mass of material will decompose and with decomposition comes fermentation and following fermentation we have the creation or formation of acids that work their way through the seams of the liner and into the water covering the burnishing material. The pitting in cases like this is identical to that which takes place when organic acids are present in the water supply. When barrels are left idle it is good practice to operate them with a new charge of soap and water at least for half an hour each week, for when this practice is followed we do not have the pitting as above described.

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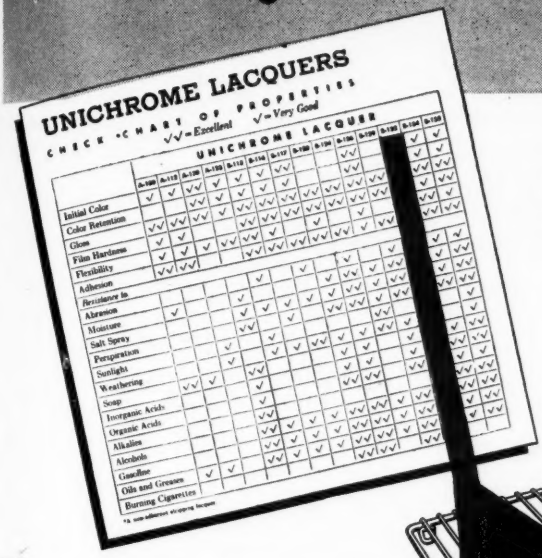

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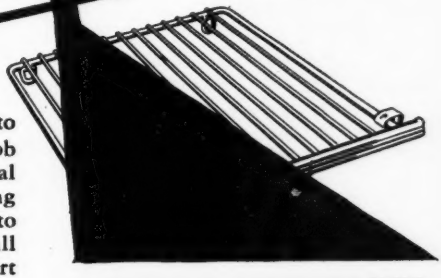

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Now we come to the final cause of pitting which will be discussed in this paper. For many years most barrel manufacturers blandly made the recommendation that steel balls and other forms when not in use should be stored in a solution of cream of tartar and the recommendations ran all the way from 2 oz./gal. to 6 oz./gal. This is just about the worst thing you could do to highly polished steel balls. How did this process originate and who is responsible for it? Well that is a fair question and so we tried to find the answer, and this is most likely what has happened.

We have it from our good friend George Gehling, a plater of many years' experience and a past supreme president of the American Electroplaters' Society, that, shall we say about forty years ago, there came to Union City on the Naughtuck in Connecticut, from England, a plater named Haynes. He brought with him a method for caring for brass parts that had just passed through what was termed as the "ashing" process. After the parts were ashed (an operation not unlike scouring) it was his recommendation that they be immersed in a solution of cream of tartar and water to prevent tarnish and discoloration until they passed onto the next production stage. Originally, this solution was 2 oz./gal., but perhaps through the over zealousness of some cream of tartar salesman the proportion was gradually stepped up to the 6 oz./gal. we sometimes find recommended. We believe it is safe to assume that from this beginning of two parts of this to one of that, that a lot of misconceptions in barrel finishing procedure developed.

It is not strange that some chap might have reasoned that if such a solution would protect brass parts that it would also be a fine thing for steel balls. Well, it did not turn out to be so and therefore let us caution you not, under any circumstances, to use this cream of tartar solution as a storage method. Take a beaker and make up a solution of either 2, 4, or 6 oz./gal. of cream of tartar and tap water. Add to this a handful of new polished steel burnishing materials. Let this stand a week and then examine it. It will tell its own story.

Before proceeding to the remedy for the conditions as above described, there is one other source of trouble that develops with steel burnishing material caused by a woeful lack of understanding of the use of soap by the average barrel operator, and especially so when hard water is the only kind available for use in the lu-

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bricating fluid. The presence of calcium or magnesium in the water supply produces hard water and unless some medium is used in conjunction with the soap itself to provide for sequestration of these calcium and magnesium elements, we will then have formations of insoluble lime or magnesium soaps deposited on the surface of the burnishing materials, and such films simply defeat the best efforts in obtaining satisfactory finishes. It is the exception rather than the rule to find a barrel in operation where the material is bright and clean or shall we say in new condition, but it is possible to maintain it in just that way and by use of the same procedure as will be recommended for the removal of pits and rust. Remember that your parts will be just as bright as is your burnishing material. If the material is covered by this insoluble soap film it is not enough to say "Well, we will just toss in a shovelful of caustic soda and a couple buckets of hot water and run the barrel for a while." It will be far better to spend a little more time and do the job as it should be done.

Now that we have covered the principal elements that lead to rust and pitting you will want to know just what to do to refinish and recondition the material. First secure an ordinary magnifying glass. This you will find at the stationery counter in most every five and ten cent store and it can be purchased for not more than a quarter. Even though you may boast of having 20-20 vision, that still will not suffice to determine the pitted condition of steel burnishing material. Wash, rinse, and dry a handful of the materials and then examine them through the glass. If pitting is present, you will immediately see it and it will be so manifest that you will recognize the need for some remedial treatment. If the material is rusted onto lumps that run from as large as a walnut to almost as large as your head, then there is not much hope for it, however, if it is all still separate but rusty, then there is a chance to reclaim it. If after examining your materials you are in doubt, then send us a small sample—a teaspoonful will do—and we will try to advise you the entire procedure to be followed.

To refinish and reclaim such material will require an unlined barrel. It may be the cylindrical type, either high and narrow or long and narrow, or it may be of the oblique tilting type. If you use either of the closed type of barrels be sure that the barrel is properly vented, this precaution however is not observed on the oblique tilting type which is, of course, an open end barrel.

If your material is badly rusted, but not welded into lumps, place a suitable quantity in the barrel, add water to just the surface of the mass and then start the barrel in operation, adding just enough sharp builders' sand to

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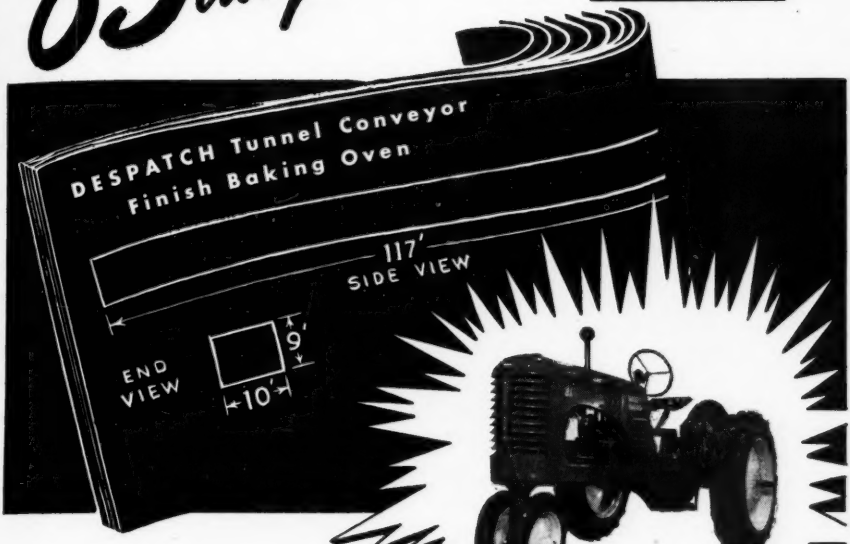

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OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

make a creamy solution of about the consistency of ordinary table cream. It is not always easy to judge the proper quantity when a closed barrel is used, but if you will start with three pounds of sand to each gallon of water that should be about right. Operate the barrel until all signs of rust have been ground away and examine the edges of the pits with your glass to be sure that they are well rounded off. Now wash out the sand solution as completely as you can and then add a charge of water and soap and operate with this for say half an hour and in this cycle you will remove all remainders of sandy muck, and the heavy soap lather will hold most of this in suspension so that it can be rinsed away.

After you have completed the sand run and cleaned both barrel and materials, start all over again by adding water to the level of the mass in the barrel, but keep account of the number of gallons of water used. Now to each gallon of water in the barrel add one pound of Allwood Vienna Lime. Examine the barrel vent to see that it is functioning correctly and if no vent is present then be sure to release the pressure on the lid opening at least each two hours of operation to vent off the expanded air. If you do not do this and wait till the operation is completed you may find yourself liberally sprayed with lime whitewash. The final or lime treatment is identical to the operation in which the materials are subjected in the first instance of manufacture and as they come to you, and you can pretty closely approximate this finish right in your own shop. If you do not own a cast iron or steel unlined barrel, perhaps you have a neighbor who owns one and whose burnishing materials also require reconditioning, and indeed this factor of barrel finishing is so important that there should be some one metal-finishing establishment in each locality that would arrange to do this work on a jobbing basis. If work is simply pitted and not rusted, the lime operation is all that will be required and the sand run can be omitted. Generally, you will find that it will require the removal of at least from one half to three quarters of one ten thousandth of surface to acquire a new polished surface, and with the lime operation this will mean continuous operation of the barrel for twelve to eighteen hours. After the operation is completed, proceed to wash out the lime and follow this with a soap and water run same as in the sand operation, and the materials can then be transferred direct to your wood lined burnishing barrels and used in the same manner as new materials would be used.

The periodical reconditioning of burnishing materials is an important factor in general barrel finishing procedure. In those plants where batteries of barrels are used and where we are the active consultant, we always maintain a reconditioning barrel, preferably an oblique tilting type with cast iron shell. We then set up a rule that all burnishing material must pass through this reconditioning cycle at least once in each three month period. It is not a costly operation and does not interfere with production. It does assure smooth and pitless burnishing materials at all times and represents the best in the attainment of barrel finished surfaces on the complete line of parts produced.

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"Vienna Brand" Lime

Made from Limestone that is identical in chemical analysis and geological structure with European Imported Lime. Tests show a "lime cake" made from Allwood "Vienna Brand" Lime equals the finish made from imported lime.

WRITE FOR FULL PARTICULARS

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Manitowoc • Wisconsin

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. . . a soluble buffing compound that removes readily from buffed surfaces.

Wyandotte Buffing Compound—specifically designed for zinc base die castings and aluminum—eliminates the labor and costs of vapor degreasing and emulsion pre-cleaning . . . and gives excellent results in cutting and coloring operations.

Shown above are two bars of buffing compounds—a Wyandotte bar and a representative competitive bar. Both measure approximately 2″x2½″x8″. Both bars were given identical treatment—(1) 30-minute partial immersion in tap water, 125° F. and (2) 10-minute partial immersion in sulphuric acid solution 2½% by volume, room temperature.

Note the solubility of the WYANDOTTE bar to both water and weak acid solution. The ease with which this Wyandotte compound can be removed should help you with your production problems.

Let your Wyandotte Service Representative demonstrate for you the remarkable quality of Wyandotte Buffing Compound. All you have to do is give him a call.

Wyandotte

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WYANDOTTE CHEMICALS CORPORATION • **J. B. Ford Division**
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Did you notice that we have specifically specified Allwood Vienna Lime? There is a story back of that too, and perhaps we had better tell it to you. Thirty one years ago we were assistant to the general manager of The Atlas Ball Company in Philadelphia (now the steel ball production division of S. K. F. Industries, Inc.). We were having trouble securing the finishes we wanted on steel balls for bearings which is a lime finish produced exactly as we have described your refinishing procedure. We experimented with foreign limes from Austria, Belgium, France and as I recall it, Italy, and with a wide variety of local limes. Finally, we hit on Allwood Lime and in all comparative tests this lime proved itself to be the finest of the lot and it has been consistently and regularly used all down through these years with the most complete satisfaction. We recall that at that time it was our pleasure to meet our first traveling lady sales manager in the person of Miss M. E. Squire of the Allwood Company and we learned so very much of lime and its characteristics from her that it has stood us in fine stead in all of our research work. So we think you will understand why it is a real pleasure for us to pay tribute to the product of a highly regarded and greatly respected business friend of many years standing, the Allwood Lime Company of Manitowoc, Wisconsin.

AO Body Safety Guide. A body safety guide which classifies hazards by industries and recommends the proper safety clothing and equipment for maximum protection has been published by the American Optical Co., Southbridge, Mass. The guide classifies 21 hazardous types of work found in the 18 industries listed and also includes pictures and descriptions of different types of safety clothing which should be worn for protection against each hazard. Copy free upon request.

Doing Something About the Weather

•

A SCIENTIST checks the corrosion resistance of oil-treated metal panels in a weatherometer or artificial weather-making machine in the corrosion section of Gulf Oil Corporation's research laboratories. Here, the panels are subjected to a maximum temperature of about 140 deg. F., rays of ultra-violet of an intensity of about 10 times that of noon-day sun, and intermittent water spray to stimulate the severest conditions imposed by sun, rain, and heat. Many thousands of rust-preventive petroleum compounds may thus be tested in a fraction of the time required in actual exposure.

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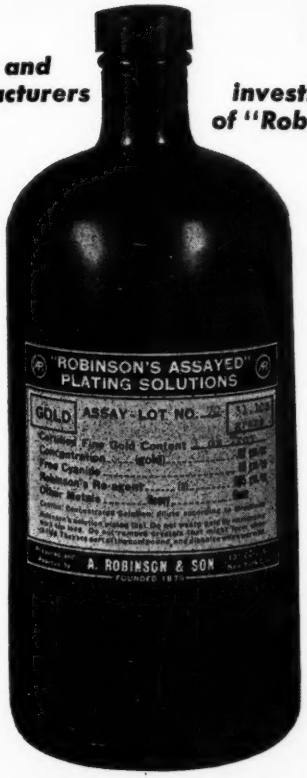

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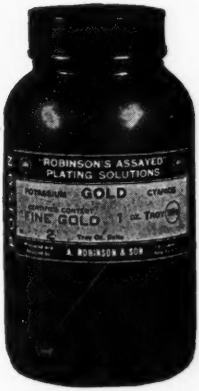

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Fedders-Quigan Solve a Problem in Corrosion Engineering

By NORMAN P. GENTIEU

FOR optimum performance, electric refrigeration—today's indispensable "luxury"—depends upon the flawless interior of its condenser tubing. Because refrigerants are hypersensitive to impurities, certain rigid standards for cleanliness have been formulated.

A quotation from A.S.T.M. Designation A254-44 will serve to illustrate the quality of this cleanliness: "13. When specified by the purchaser, tubing for certain uses, such as refrigeration condensers, shall conform to the following requirement for internal cleanliness: When a length of tubing such as copper brazed steel tubing $\frac{3}{16}$ inch or over is washed internally with redistilled chloroform or redistilled trichlorethylene, the residue remaining upon evaporation of the solvent shall not exceed 1.25×10^{-4} g. (0.000125 g.) per square inch of internal surface." In other words, the tubing of the completed condenser unit must not contain residue in excess of 18 milligrams per square foot.

This was one of the production problems at the Fedders-Quigan Corporation of Buffalo, leading specialists in the field of heat transfer and refrigeration mechanisms. Their "headache" —now happily banished—was the fact that most of the nationally known refrigeration equipment industries for whom they manufacture refrigerant condensers set up standards even more exacting than those of the American Society for Testing Materials. Instead of a residue not in excess of 18 milligrams per square foot, the refrigeration equipment industries demanded less than 9 milligrams of residue per square foot.

A major portion of condenser tubing comes to Fedders-Quigan Corporation from a well-known supplier of tubing and as received (not over 2.0 milligrams of residue per square foot) is well within the allowable limit. However, it is virtually impossible to prevent the contamination that arises as an unwanted by-product of further stages in fabrication. Tests indicated that this amounted to at least 200 mg. per condenser or 260 mg. per square foot.

In the manufacture of the condenser, the tubing is bent into the required shape and imbedded in a multiplicity of steel radiating fins. After several soldering operations, the condenser is pickled, rinsed, fluxed, and tinned over the entire external surface.

Despite precautions, the omnipresent contaminating factors get past plugs inserted into the ends of the tubing, or are introduced during soldering.

The chief offender is the muriatic acid pickling solution, minor contaminants being the rinse water and the fluxing solution. All three of these solutions, acid in varying degrees, can cause a rust condition within the tubing that is injurious to the refrigerant, in this case, Freon.

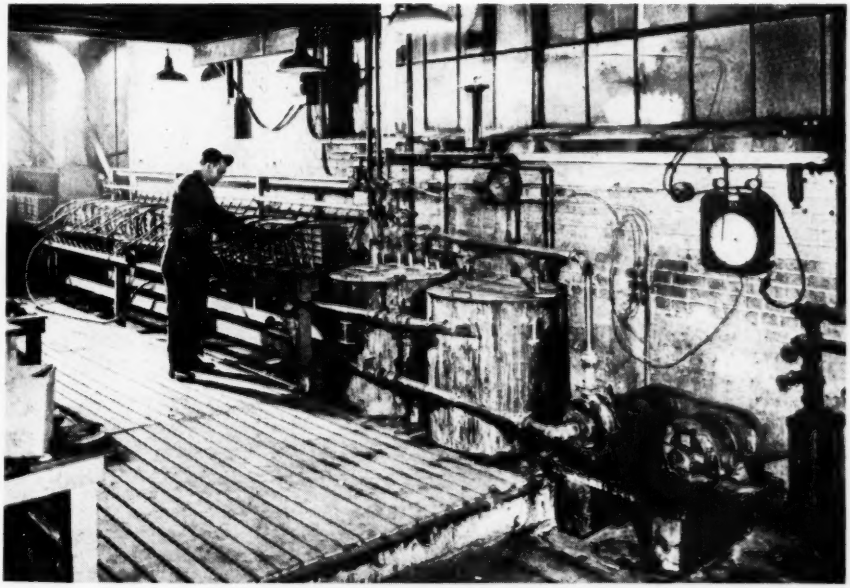
The design engineer for Fedders-Quigan Corporation who laid out the cleaning cycle, first tried various acid solutions from which citric acid was finally chosen. This was fairly efficient for removing the rust but neither did it remove any oil or grease that remained from a previous alkali cleaning, or that was picked up during the pickling, rinsing, and fluxing operations, nor did it prevent the formation of films of rust during the rinsing and subsequent drying of the tubes. Unfortunately, the residue of oil and rust usually exceeded the amount allowed in customers' specifications.

This was the dilemma presented to the American Chemical Paint Company early in 1945. After careful study, ACP engineers evolved a cleaning process that, while new, utilized the existing equipment layout at Fedders-Quigan.

First, the citric acid method was discarded because of its inability to eradicate all impurities.

Then, the results of preliminary tests disclosed that Deoxidine 10E removed rust and oil effectively from the condenser tubing and prevented further formations of rust by means of the protective action of the solution. In addition, residual material was reduced to less than one-half the allowable amount (9 milligrams per square foot), gratifying operating margin of safety.

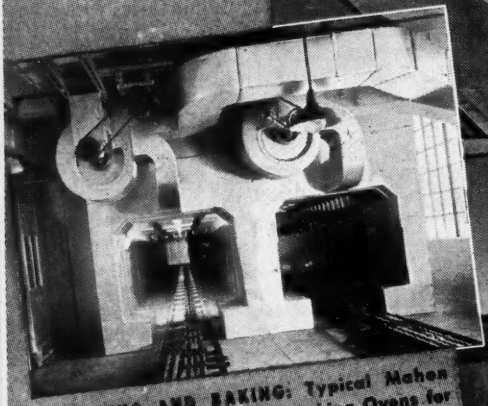
Equipment used in the process con-



Deoxidine 10E installation at Fedders-Quigan Corporation, Buffalo, New York

COMPLE E

SPRAYING: Mahon Hydro-Filter Spray Booth arrangement for painting the underside of automobile bodies.



DRYING AND BAKING: Typical Mahon Tunnel-type Drying and Baking Ovens for automobile bodies.

SPRAYING: Mahon Hydro-Filter Spray Booths in a typical automobile body painting production line.

M

SYSTEMS

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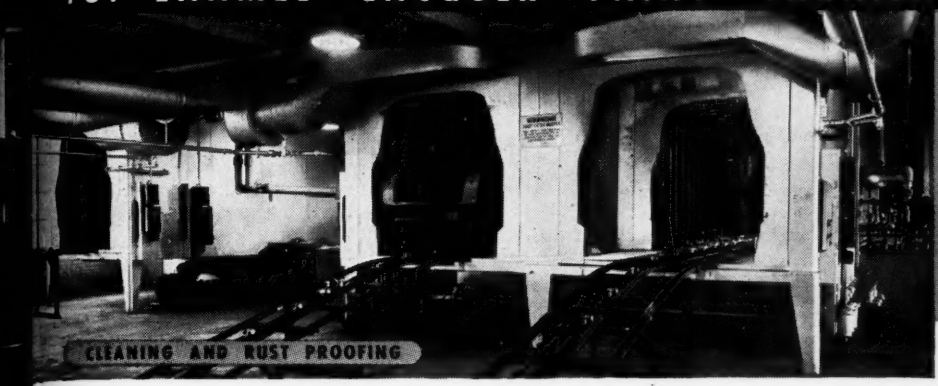

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sists of two cylindrical tanks of about 100 gallons capacity each, one acidproof pump, and an assortment of acidproof piping and valves. The solution is pumped into a header to which 30 condensers are attached in parallel by means of rubber hoses. The solution flows from the header, through the condenser tubes, and into another header from which it flows back into the circulating tank. At the conclusion of the period the solution is blown back to the tank with steam.

Rinse water is then pumped through the same system from the second tank, after which steam is blown through the system. Next, the condensers are disconnected from the headers and compressed air is blown through each condenser in order to dry the tubing. The operation is completed by sealing the open ends of the tubing with polyvinyl caps.

Since the first installation of the new cleaning process, several more units have been installed in order to handle the required production. Each entire unit is operated by one man who cleans approximately 60 condensers an hour or an average of one a minute.

The sequence of operation is as follows:

1. Rinse with cold water for approximately 1 minute to remove most of the solid foreign matter picked up in the solder dip operation.

2. Pump a solution of 1 part Deoxidine 10E and 3 parts water through the system for at least 10 minutes—maximum temperature, 140 deg. F.

3. Blow the solution from system to the Deoxidine tank with steam.

4. Rinse with water at 160 deg. F. minimum, discharging dirty rinse water to sewer.

5. Blow out system with steam for at least 3 minutes.

6. Blow out condensers individually with compressed air until dry. It is

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important that dry air be employed.

NOTE: Regular examinations are made to determine when additions of Deoxidine 10E to the circulating tank are necessary in order to maintain the solution at its optimum strength.

Frequent tests of the tubes, conducted under careful supervision, have disclosed some interesting facts. For example, the amount of residue remaining inside the tube after the Deoxidine 10E treatment averages about 2.0 milligrams per square foot of surface, or less than half the amount permitted by the most exacting customer and less than one-fifth the amount prescribed in A.S.T.M. specifications.

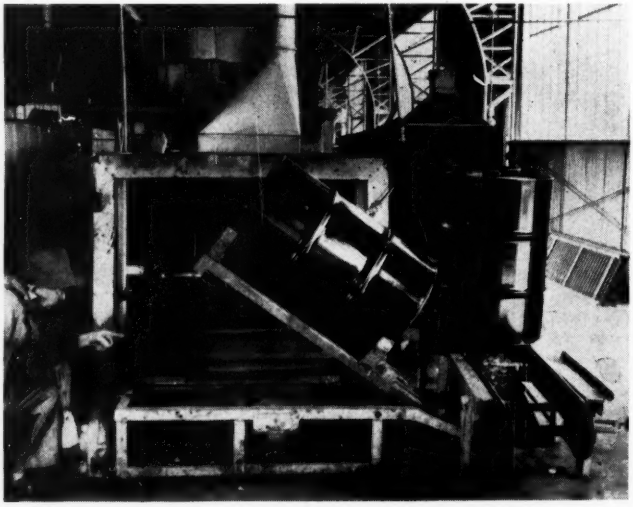
Other reports, not disclosable at this time, give evidence of similar consistent results. In the language of diplomacy, an effective sanction has been invoked against rust and rusters.

Finishing Metal Products. Second edition. By Herbert R. Simonds and Adolph Bregman. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 352 pages. 135 illustrations. Cloth binding, board covers. Price, $4.00.

This book comprises a treatment of the finishing of metal products from a broad point of view, indicating the way both to more attractive metal finishes and to more efficient means of producing them. The authors describe not only the techniques involved in metal finishing, including such processes as cleaning and descaling, but also the commercial aspects, the sales value of attractive finishes, the effect of color, and so on. The book also goes into detail on the economics of metal finishing, the equipment involved, the design of parts which require finishing, meltal finishing costs, and so on.

Comprising the book is a total of 33 chapters which are divided into six principal parts headed as follows: Commercial Aspects of Finish and Appearance; Preparation for the Finish of Metal Products; Polishing and Buffing; Plating and Spray Coating; Organic Coating; and Special Finishes.

"Sodium Hydride Descaling and Desanding of Ferrous Castings and Forgings," a reprint of an article dealing with the special application of the sodium hydried process to iron castings and forgings, is now being distributed by the Ajax Electric Co., Inc., Frankford Ave. at Delaware Ave., Philadelphia 23, Pa. Copy free upon request.



AT the New Orleans plant of the Rheem Manufacturing Company, automatic delivery of steel barrels from a paint baking oven is achieved by having an emergency barrel trip switch which starts the cycle of the unloading mechanism.

(Photo courtesy Rheem Manufacturing Co., New York 22, N. Y.)

CLEAN-UP MAN *Saves Time* AND MONEY

SUN SPIRITS . . . Replaces Three Other Cleaners,

Costs Less, Cleans Better, Lasts 4 to 5 Times as Long

An Eastern manufacturer formerly used gasoline, kerosene and other materials for cleaning motor parts in the reconditioning shop. Dirt was not completely removed, however, and fumes were both a fire and a health hazard, requiring the installation of hoods.

All troubles were eliminated when Sun Spirits was adopted. Now parts are cleaned more completely. There are no objectionable fumes. The fire hazard is reduced.

Slow evaporation in the cleaning tanks means that Sun Spirits lasts 4 to 5 times as long as carbon tetrachloride, and costs 75% less.

This case is typical of the many plants in which Sun Spirits is used for fast, simple, metal cleaning. There are no dangerous chemicals; no complicated, expensive machines; no need for highly skilled operators. Get in touch with the Sun man for complete data.

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Finishing Clinic

Chemical Treatments for Finishing Magnesium

THE finishing engineer dealing with magnesium should keep in mind that it, in common with other metals, is subject to corrosion. In general, protective chemical treatments and recommended paint systems are satisfactory for protecting magnesium alloys against the corrosive effects of normal weathering and many corrosive atmospheres. Chemical treatments provide a passive surface layer with inhibitive characteristics. While it is true that most of the chemical treatments do not provide adequate protection in themselves, they do provide some resistance to corrosion and serve as paint bases. Suitable paint systems, consisting of one or more coats of primer followed by one or more coats of recommended paint applied over protective chemical treatments, provide magnesium alloys with adequate surface protection for the majority of uses. Generally, the choice of chemical treatment and final protective or decorative finish is determined to a large extent by service requirements and to some extent by the composition of the alloy. Details are given for the chemical treatments most commonly used based on recommendations of The Dow Chemical Company.

Chrome-Pickle Treatment. This treatment is primarily a producer's treatment which is applied to protect magnesium parts during storage and shipment. It is, however, often used by the metal finisher where a paint base coating with low electrical resistance is required for bonding purposes. It is also used to remove

flux after gas welding. When conditions permit, the chrome-pickle can be used for touch-up on areas from which the chemical treatment has been removed, as well as for brush applications on parts too large to be immersed. The etching action of the chrome-pickle treatment removes about 0.0006 inch of metal per surface (0.0012 inch per diameter) and hence cannot be used on machined surfaces unless tolerances will permit or proper allowances have been made. Magnesium parts containing steel or brass inserts can be given the chrome-pickle treatment. Polished steel surfaces, however, should be protected with a thin film of lacquer which may be removed later with a solvent.

The chrome-pickle treatment consists, in general, of a dip requiring one-half to two minutes, depending on the freshness of the solution, in the following bath maintained at room temperature (70-90°F.):

Sodium Dichromate ($Na_2Cr207.2H_2O$) ---------- 1.5 lb.
Conc. Nitric Acid (Sp.Gr.1.42) ---------- 1.5 pt.
Water ---------- to make 1.0 gallon

Technical grades of these chemicals may be used. Pure aluminum, glass, or ceramic tanks may be used for containing the solution. Welded pure aluminum tanks are most practical for large installations.

Magnesium die castings should preferably be given a 10-second dip in the chrome-pickle solution heated to 120 deg. F. Longer time of treatment results in an excess of powdery deposit. Articles that are too large to be immersed in the chrome-pickle solution should be well brushed with a generous amount of fresh solution which is allowed to remain on the surface for about one-half minute and then is washed off. The coating thus formed is less uniform in color than that produced by the dip process but is equally

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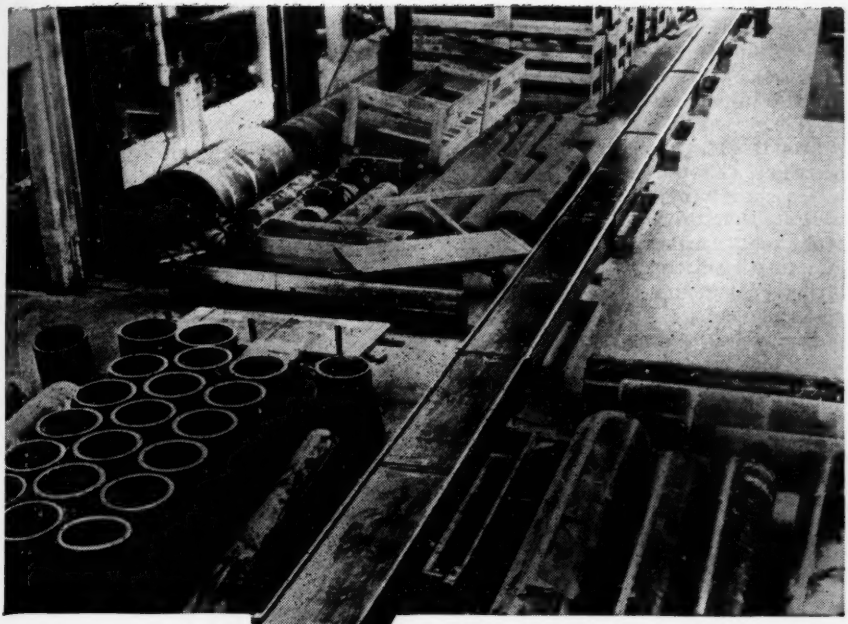
Spray painting magnesium parts after appropriate chemical treatment
(Photo courtesy The Dow Chemical Company)

as good as a paint base. In treating riveted assemblies care must be taken to avoid entrapping solution in the joints.

The color, luster, and etch produced by the chrome-pickle will vary with the age of the solution and with the composition and heat treatment of the alloy. Certain colors and etches are superior to others as paint bases, the most desirable being a matte, gray to yellow-red irridescent coating which exhibits a network of pebbled etch under the microscope. This type of coating is readily obtained in fresh solutions. Coatings to be avoided are those which are bright and brassy in color and which show a relatively smooth surface with only occasional rounded pits when examined under the microscope.

Depletion of the chrome-pickle solution is indicated by the paleness of the color, shallowness of etch, and slowness of action on the metal. The paleness of color should not be confused with that obtained by insufficient exposure to air between removal from the bath and wash in water. However, control of the bath is best accomplished by analysis.

Dichromate Treatment. The dichromate treatment provides good salt water resistance and maximum paint adhesion with practically no effect on dimensions of parts. The treatment is normally applied after machining and before painting of parts. Brass, bronze, cadium plate and steel are unaffected by the treatment, thus castings and other parts containing bearings, studs, and inserts of these metals



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may be treated. Aluminum, however, is rapidly attacked.

The dichromate treatment consists essentially of two steps usually followed immediately after alkaline cleaning.

Step 1—Magnesium parts are immersed for 5 minutes in an aqueous solution containing 15 to 20 per cent by weight of hydrofluoric acid (HF) at room temperature (70-90°F.). A satisfactory bath can be prepared by diluting one volume of technical grade 48-52 per cent HF with two volumes of water. An alternative procedure suitable for 15 minutes in an aqueous solution containing 5 per cent sodium, potassium, or ammonium acid fluoride at room temperature (70-90°F.). The acid fluoride alternative treatment will not attack aluminum inserts, rivets, and so on, and is believed to be more economical to use than hydrofluoric acid, however, it should not be used on castings of any type as inferior protective results will occur. Both treatments are followed by cold water rinse.

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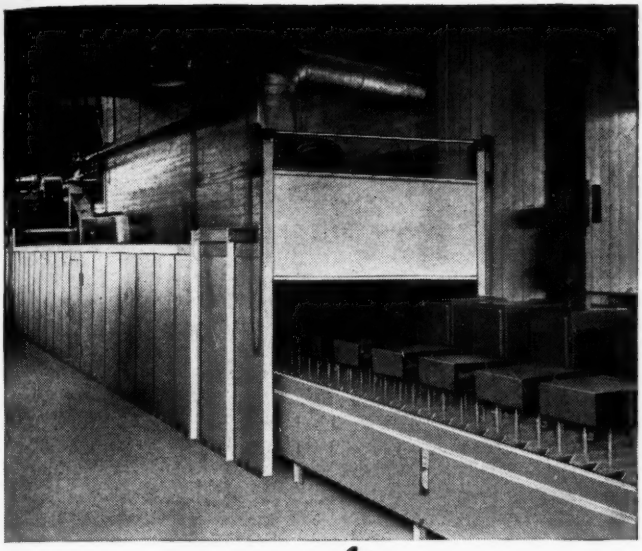
Step 2—Magnesium parts from Step 1 treatment are boiled for at least 45 minutes in a water solution containing 10 to 15 per cent by weight of sodium dichromate ($Na_2Cr_2O_7 \cdot 2H_2O$). This solution is prepared by dissolving technical grade sodium dichromate in water in the ratio of 1.0 pound per gallon. The original solution level is maintained during operation by the addition of water to replace that lost by evaporation. Following treatment, parts are rinsed thoroughly in cold running water followed by a dip in hot water to facilitate drying. The presence of fluoride (provided by film produced in Step 1) in the dichromate bath is essential for proper operation. In some cases it may be advantageous to add ¾ oz./gal. of calcium or magnesium fluoride to the bath from time to time or to suspend a bag of calcium or magnesium fluoride in the bath. If such is done the treatment time can usually be reduced from 45 to 30 minutes.

Properly applied coatings from the dichromate treatment will vary from dark black to black. Time of treatment, condition of bath, and alloy composition will influence the color of coating. Lead tanks may be used for containing the hydrofluoric acid bath. The dichromate solution can be used in iron, aluminum, or almost any of the commonly used tank materials. The dichromate treatment process is best controlled by frequent chemical analysis.

Sealed Chrome-Pickle Treatment. This treatment is a modification of the regular chrome-pickle treatment previously described. The treatment will provide protection equivalent to that of the dichromate process on wrought magnesium alloys. On sand castings, however, the protective value is somewhat less, and if they are to be used



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at all in this process they should be given a preliminary dip in the hydrofluoric acid bath described under Step 1 of the dichromate process.

The treatment is a two-step process, the first of which is the regular chrome-pickle procedure. The second step consists in boiling the work for 30 minutes in a bath containing 1.0 lb. of sodium dichromate per gallon. This is identical with the second step of the dichromate process. The boil in dichromate does not change the appearance of the original chrome-pickle coating.

The sealed chrome-pickle is particularly suited for use on assemblies in which aluminum rivets have been used since the hydrofluoric dip of the regular dichromate treatment reacts quite vigorously with aluminum. The treatment is not suitable for use on small parts machined to close tolerances because of the amount of metal removed by the chrome-pickle.

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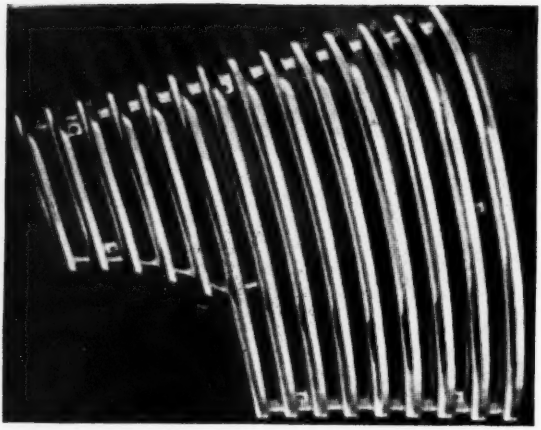

Proper buffing and polishing contribute to the brightness of this chrome-plated zinc die cast automobile radiator grill. (*Photo courtesy The Electric Auto-Light Company*)

one or two coats of colored enamel applied by spraying or dipping. The work after coating is immediately air dried and placed in a furnace maintained at a temperature of 920 ± 10 deg. F. for a period of 5 to 8 minutes, in order to allow the enamel coating to fuse and to attain the glazed finish desired. Firing is necessary after each top coat is applied. The optimum coating thickness was given by Mason as about 0.006 inch for two or more coats but the coating thickness may vary from 0.002 to 0.009 inch.

* * *

Buffing and Coloring Zinc Die Castings

THE finishing engineer concerned with the decorative electroplating of zinc alloy die castings should remember that where a high final luster is desired in the finished plate, proper buffing and coloring of the die casting prior to plating is required. Buffing or cutting down is best done with tripoli on cloth wheels. These will vary in stitching pattern and in hardness, depending on the shape of the piece being handled. In general, the number of stitches and hence the hardness of the wheel is increased as the surface to be buffed approaches a flat surface.

It is essential in the case of zinc that the tripoli used be free cutting, since excess pressure may result in dragging and waviness. According to recommendations of the New Jersey Zinc Company, a peripheral speed of about 8,500 feet per minute may be used for polishing zinc alloy die castings. The r.p.m. to give these peripheral speeds with various wheel diameters are tabulated below:

Diameter of Wheels, Inches	R.P.M. to Give 8,500 ft./min.
4	8,100
6	5,400
8	4,000
10	3,250
12	2,700
14	2,300
16	2,000
18	1,800

One fact that should be pointed out is that at very high wheel speeds excessive pressure of the work on the wheel may result in cutting too deeply into the die-cast skin, thus exposing the less dense sub-surface, which in turn may influence the durability of the subsequently applied plated coating.

Consideration should be given in the selection of buffing compounds to the compatability of the compound binder with the cleaning system which is to follow. The use of a binder not readily removable in the cleaning operation greatly complicates the problem of obtaining satisfactory plated coatings.

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complished with cloth wheels using a dry, soft compound. The compound should be dry and free from lime, since excessive grease makes cleaning difficult and the presence of lime makes both cleaning and rinsing harder to accomplish successfully. In many cases in commercial practice no coloring compound is used but a portion of the face of the buffing wheel is left free of buffing compound and the work is given a dry wipe on this part of the wheel. Combination cut and color compounds are used to some extent to produce a luster intermediate between those obtainable by a straight cutting down operation and by a coloring operation.

* * *

Applications of Solvent Emulsion Cleaners

PRODUCTION men in the finishing industry considering the use of solvent emulsion cleaners should remember that this method of cleaning was originally developed largely to answer a specific need; that is, the elimination of hand scrubbing as one step of the cleaning operation prior to electroplating. Thus, solvent emulsion cleaners are not considered to be a substitute for alkaline metal cleaners or for vapor degreasing but rather to supplement them in order that a quality job may be done faster and more economically.

Emulsion cleaners are generally sold either as concentrates or as a formulated material extended with solvents ready for use. If a concentrate is employed, the user dilutes with a grease solvent, such as kerosene, to an extent largely dependent upon the amount of solvent present in the original mixture. Generally, concentrates cannot be used satisfactorily unless they are diluted with a solvent according to the manufacturer's recommendations. A common dilution range is 1 part concentrate to 5 to 10 parts kerosene. Other solvents used, known as safety solvents, are naphthas or benzenes having a flash point above 100 deg. F. and are sold by most large oil companies. Stoddard solvent, mineral spirits, chlorinated benzene, and other such solvents may be used provided no separation into layers occurs on diluting with the necessary amount of solvent. For very difficult jobs, hydrogenated naphthas such as "Solvesso" No. 2 may be found effective.

There are, in general, three recognized methods of use for emulsion type solvent cleaners: (1) The work may be sprayed, dipped into or otherwise contacted with the cleaner, containing the desired solvent extender, without addition of water. No heat is required. Moderate agitation or movement of the work through the tank will increase solvent action markedly. After allowing the soiled work to remain in contact with the cleaner for one to three minutes, depending on the na-

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ture of the soil and the thickness of the film, the work is water rinsed. On contact with water a milky emulsion is immediately formed. The major part of the cleaning takes place in the rinse, very little oil or other contamination building up in the solvent cleaner. Rinsing is preferably accomplished by spraying with hot water, although a cold spray rinse or hose off or rinsing in a continuous overflow tank is satisfactory for some

purposes. (2) In some instances the dilute material, whether it is purchased in dilute form or as the concentrate and diluted by the consumer, is added to water, forming an emulsion. This emulsion is the cleaning medium used in a pressure spray washing machine at temperatures in the range of 140 to 190 deg. F. (3) In other cases, the emulsion, as prepared in water, is used in soak tank operations. Sometimes a small amount of alkali is added and high operating temperatures are desirable. This is considered to be the least effective method of application both from a practical and theoretical standpoint.

From the functional standpoint, precleaning metals with solvent emulsions takes the "cling" out of the soil, leaving the solid particles coated with a soap or a surface active agent. In this form such dirt particles are readily deflocculated and carried away by the force of the water rinse. Of interest to the production man in this connection is that alkaline electrolytic cleaning baths, which usually follow solvent emulsion cleaning, are not loaded with floating oil and suspended dirt where this heavy contamination is removed in precleaning. Consequently, such solutions require less frequent replacement. The time involved for cleaning is shortened markedly, thus speeding up the cycle and saving current costs. This is of particular significance where high current density anodic cleaning methods are being used.

One outstanding advantage in using solvent emulsions for precleaning is the fact that they have no action on active metals such as zinc, aluminum, lead, tin, copper, and brass. Their use in precleaning permits a very short immersion in the alkaline cleaner with almost no attack. The finishing engineer may find this to be of particular importance in the cleaning of zinc base die castings where it has been definitely proved that over-cleaning and over-pickling may result in blistered or peeled copper plate.

Pickling Aluminum and Aluminum Alloys. A technical bulletin on the pickling of aluminum and aluminum alloys with the aid of "Troxide" is now being distributed by the Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa. Copy of Technical Bulletin No. 16 free upon request.

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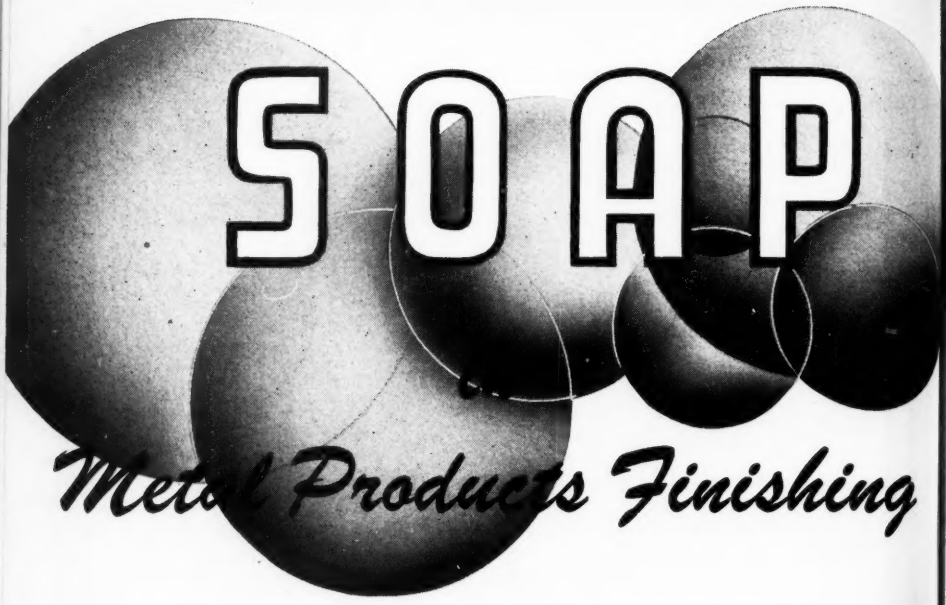

By GEORGIA LEFFINGWELL, Ph.D. and MILTON A. LESSER, B.Sc.

ALTHOUGH most people think of soap only as a cleansing agent, it is used individually or in combination to perform a great number of industrial functions unrelated to cleanliness. It is an efficient emulsifying agent, a fact apparent to everyone who has used soap solutions for removing oils and greases from metal surfaces. This emulsifying property is extensively used in industry to make numerous products based on miscible combinations of aqueous solutions and oily materials.

Because it efficiently lowers surface tension, soap is useful where good "wetting" and penetration are desired, as on metal parts with recesses or threads that are not amenable to other materials or methods. As a lubricant it is essential, not only in metal stamping and drawing, but also in the efficient performance of certain metal-finishing compounds. Of course, there are a large number of different types of soap to meet the needs of specific tasks. This, obviously, permits the worker to select the kind most suited to the job at hand.

As a detergent in metal cleaning, soap is generally used as the emulsifying ingredient of metal-cleaning compounds which are essentially mixtures of alkali. The alkaline strength of these mixtures and the concentration of the cleaning baths vary with the kind of dirt and type of metal encountered. The purpose of metal cleaning is the removal of foreign matter from metal objects after they have been subjected to shaping processes such as casting, drawing, rolling, or machining, all of which leave their residue of chips, dirt, grease, and oil. Removal of such accumulations is

important prior to straight polishing and finishing, and an absolutely clean metallic surface is a prerequisite for successful electroplating, anodizing, enameling, painting, or the formation of other protective and decorative finishes. Very often, poor adhesion, porosity, blisters, and other faults in final finishes may be traced directly to inadequate cleansing.

Aqueous solutions of soap and soap-alkali mixtures have an outstanding reputation for their ability to remove oils, greases, and waxes and various types of dirt incidental to producing and fabricating metal objects. Although equipment and methods have been increasingly mechanized to meet new demands, and many new factors have entered the picture, soap has kept pace with these developments. This is evident not only in manufacturers' catalogs offering soaps particularly suited to modern needs but also in studies (1, 2) made a decade apart. In both of these studies, recognition is given to the role played by soap for degreasing and cleaning metals. Such investigations stress the importance of selecting the proper cleaning agent on the basis of the metal being treated and the type of dirt to be removed.

Of decided interest in this connection is Seabright's (3) report on methods for testing cleaner solutions. Concerned primarily with cleaners used on sheet metal before enameling, this study brought out the fact that soap can rejuvenate a cleaner if enough free alkali is still present to promote chemical cleaning.

Soaps and soap-containing preparations are used in immersion, soak-type cleansing processes. In standard prac-

(1) Wright, L. & Taylor, F.: J. Electroplaters' & Depositors' Tech. Soc. 6:71, 1931.
(2) Mabb, P.: Metallurgia 23:81, 1941.
(3) Seabright, E. C.: J. Am. Ceram. Soc. 27: 90, 1944.

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tices, soak cleaning tanks use solutions based solely on soap or on soap-alkali mixtures. Soaps, especially those compounded to provide high emulsification, are particularly effective as soaking type cleaners for removing the heavier loads of oils, greases, and more solid dirts from metallic surfaces. The soap is dissolved in hot water and the work to be cleaned is soaked in such baths until the grease has been emulsified and the adherent dirt loosened. Subsequent rinsing in clear water removes both the soap and the dirt.

Although they are useful for cleaning most metals, soap cleaners are especially valuable for brass, aluminum, and die castings, all of which are readily attacked by alkalis. When properly prepared, soaps for such purposes show little chemical change and should not tarnish nor corrode these metals.

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In cases where solvents have been used to dissolve greases and oils, a final scrubbing with hot soap suds is generally advocated (4). The cleaned articles are then rinsed in hot water and finally in cold water. Such treatment is especially important with articles that are to be electroplated.

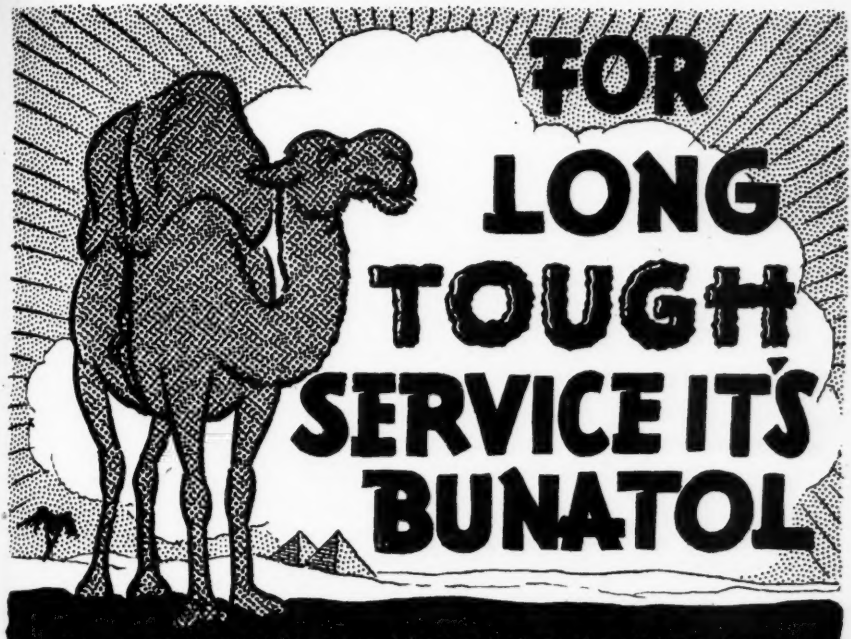
Several patented processes for cleaning metal surfaces prior to further treatment specify the use of various soaps. In one case (5), a composition containing soda ash, red ocher, and soft soap is used for cleaning and descaling ferrous metals. In another instance (6), a special soap solution is employed in a "bright" dipping and silvering process. The solution specified in the patent not only acts as a cleanser but also applies a coating of soap to the brass bases for lights.

Soap cleaners find frequent use in removing buffing compounds from highly polished surfaces. Soaps with good wetting properties are able to penetrate into deep depressions and backgrounds to soften and quickly remove dirt. Effective on nickel, steel, nickel steel, and like metals, properly formulated soaps should also clean buffing and polishing dirt out of copper, brass, and aluminum work without tarnishing the surfaces.

According to Bennett's (7) standard text, a soak cleaner for removing tripoli and buffing compounds from brass and the like is based upon a coconut oil-tallow soft soap plus various quantities of pine oil, boric acid, and cane sugar. If desired, other fat mixtures may be used, within certain limits, for making the requisite soap base.

Suitable penetrating soaps are use-

(4) Crowley, C. A.: "Money Making Formulas," Chicago, Pop. Mech. Press, 1939, pp. 229-230.
(5) Palmer, A. S.: Brit. Pat. 519,156, 1940.
(6) Westinghouse Electric International Co.: Brit. Pat. 529,589, 1940.
(7) Bennet, H.: "Chemical Formulary," Vol. VI, New York, Chem. Publ. Co., 1943, pp. 492, 417.



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ful also in cleaning watch cases, silverware, jewelry mountings, and similar fine work. This brings to mind the solution suggested by Oldham (8) for removing grease, rouge, and other buffing and polishing residues used in making gold jewelry. He recommended a washing solution consisting of one-half ounce of mild neutral soap dissolved in one pint of ammonia with one gallon of water, used hot (e.g., 150 deg. F. or over).

Electrocleaning processes for preparing metals for finishing treatments have found increasing use in recent years. Soap has a role in many of the electrolytic solutions used in such methods, but, of course, the solution employed depends largely upon the type of metal treated. According to Crowley (4), a solution suitable for the electrocleaning of iron or steel to remove buffing and polishing greases is made from:

Sodium hydroxide	½ lb.
Laundry soap	¼ lb
Water	1 gal.

For brass and other alloys of copper, he recommends the following solution:

Soda ash	4 oz.
Trisodium phosphate	2 oz.
Laundry soap	2 oz.
Sodium hydroxide	½ oz.
Water	1 gal.

Both of these solutions should be used at a temperature of 212 deg. F. The supporting rods for the work to be cleaned are attached to a suitable 6-volt d.c. supply and rheostated through a reversing switch. The work should be suspended in the cleaning solution and the rheostat adjusted until a large volume of gas is liberated. The current is reversed every few seconds, about 3 or 4 minutes sufficing. The work is then removed and rinsed in hot and cold water.

In cleaning magnesium die castings

(8) Oldham, P. A.: Metal Ind. 37:72, 1939.

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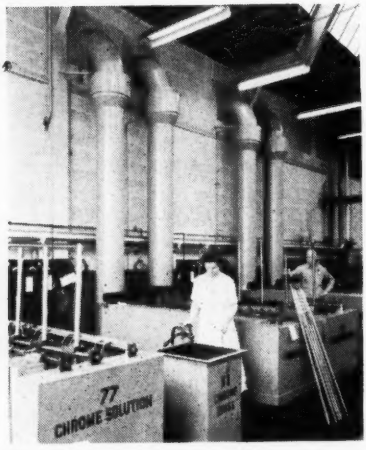

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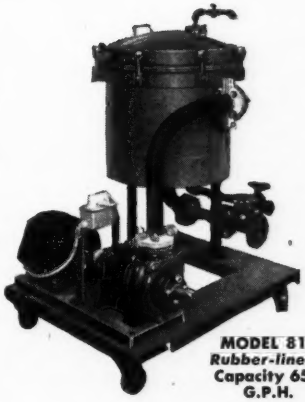

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soap - containing solutions may be used. According to Schmidt (9), a satisfactory solution either for boiling or for cathodic electrolysis is made as follows:

Trisodium phosphate	4.0 oz.
Sodium carbonate	4.0 oz.
Soap	0.1 oz.
Water, to make	1.0 gal.

As a bath, this cleaning solution is operated at 90 to 100 deg. C., the time required being 5 to 15 minutes. As an electrolytic cleaner, the solution may be operated below the boiling point without the need of agitation. The magnesium is made with the cathode in the solution, and a direct current of 10 to 28 amperes per square foot of surface is applied. Usually 1 to 3 minutes are required for complete removal of oil or grease.

Although soap finds its most important uses in preparing metals for special finishes, this versatile material has properties which make it important in products for finishing materials. Its suspending and lubricating properties, for example, are often used in making lapping compounds and other grinding and polishing combinations. Illustrative is the following lapping compound for brass or bronze:

Silica (325 mesh)	16.5 parts
White soap flakes	2.5 parts
Sodium silicate	1.0 part
Water	80.0 parts

(9) Schmidt, H. W.: Chem. & Met. Eng., Sept. 1941, p. 158.

Ball burnishing is another phase of metal products finishing where soap comes into quite extensive use (10). With soap as a lubricant for the steel shot or other burnishing agents, ball burnishing provides an excellent finish and appearance to articles like pins, nuts, bolts, castings, and stampings. Ball burnishing provides for economy of handling and is a finishing process that lends itself readily to mass production.

Applicable to many metal products, the following method for treating aluminum and aluminum alloys, given in one manufacturer's manual (11), is indicative of the general procedure. Work which has been previously cleaned is placed in a barrel in the ratio of two parts of shot to one part (by volume) of objects to be cleaned. The barrel is filled about two-thirds with water. For a barrel approximately 8 inches wide x 30 inches in diameter, about 4 ounces of soap flakes or burnishing soap are added. The barrel is rotated at about 25 to 35 r.p.m. for approximately one - half hour, then opened, the dirty water removed, and the barrel rinsed. Fresh water and soap are added in the previous proportions. The time of the second rotation will depend upon a number of factors.

After burnishing, objects without recesses or threads may be dried and

(10) Bayles, D. P.: Domest. Commerce 32:14, Feb. 1944.

(11) Anon.: "Finishes for Aluminum," Pittsburgh, Al. Co. Amer., 1942, pp. 25-7.

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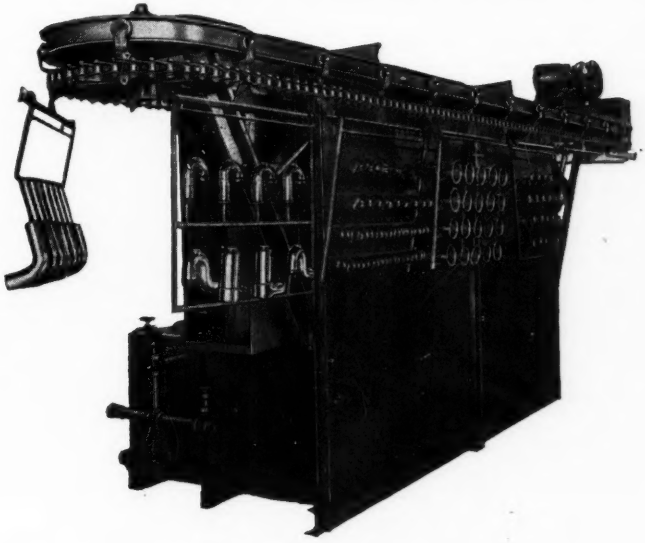

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WASHING, PICKLING AND DRYING EQUIPMENT

further brightened by tumbling in hardwood sawdust. Threaded parts or similar pieces should be dipped in benzene and washed in hot water. After this, the excess water is blown off and the objects are placed on a steam table to dry.

Of course, the proportions and procedure will vary somewhat with other metals. Thus, for gold jewelry, Oldham (8) recommends that ball burnishing be carried out in a tank containing a solution of 1 to 3 ounces of neutral soap flakes per gallon of water.

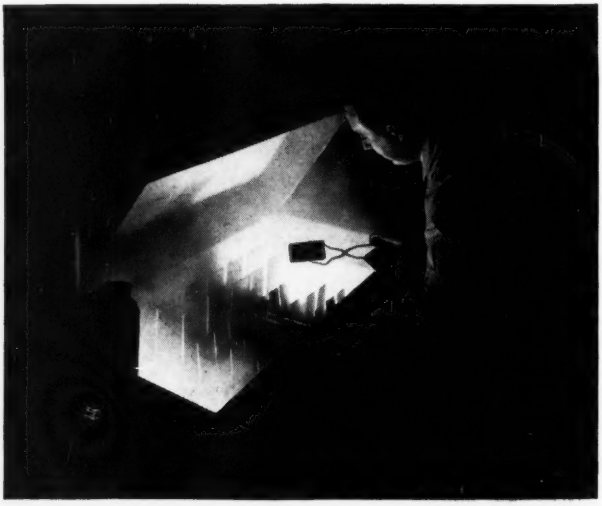
The lubricating qualities of soap may be used also in creating special finishes. In the satin finishing of aluminum, for example, steel wool lubricated with soapy water provides very satisfactory results (11).

Bridgeport Grinding Machinery and Grinding Wheels are the subject of a 16-page catalog published by The Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn. The catalog provides illustrated, descriptive, and tabular information on horizontal face grinders, vertical surface grinders, knife grinders, floor stand grinders, buffing lathes, cut-off machines, cutlery grinders, special grinding machines, and grinding wheels. Copy of Catalog 146 free upon request.

"How to Fight Fire and Protect Property with Carbon Dioxide" is the title of a 24-page catalog published by Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago 11, Ill. The catalog graphically explains and illustrates the latest techniques in fighting fires with carbon dioxide and other types of fire extinguishers.

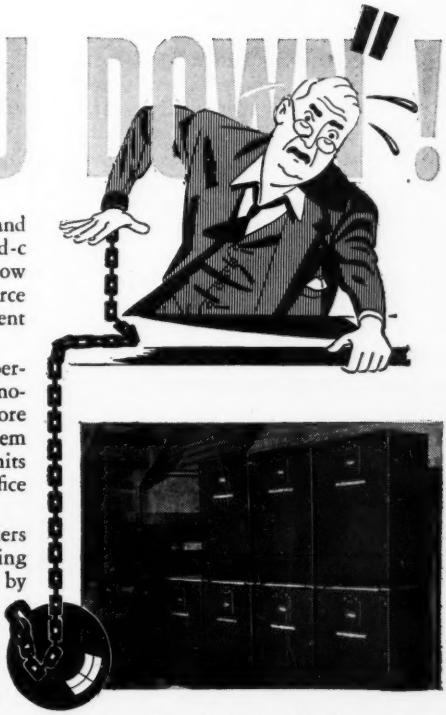
By means of photographs and diagrams, the catalog answers such vital questions as: What type fire hazards should I recognize?; How can I mobilize my employee fire defense?; What is the correct spacing and bracketing height for various type fire extinguishers?; What are the improved methods of operation for carbon dioxide, soda-acid, foam, pump tank, and carbon tetrachloride extinguishers? Copy of Catalog R-5827 free upon request.

Salt Spray Test Against Corrosion



ONE step in the constant battle of science to protect metals exposed to marine conditions from corrosion is revealed in this illustration of a salt spray and cabinet in use in the corrosion section of the research laboratories of Gulf Oil Corporation. Metal panels coated with experimental rust-preventive compounds are subjected to a mist of synthetic seawater at a temperature of 100 deg. F. The effects of months of exposure can be ascertained in a few days, thus permitting the testing of thousands of compounds yearly to improve the protection of deckloads aboard ship, machinery and installations on ship and shoreline, and naval ordnance.

HERE IS PLATING POWER THAT WON'T "TIE YOU DOWN"!



Suppose your work-load changes and you need a different range of d-c voltages, or increased current at low voltage. Will your present d-c source "tie you down," requiring replacement to meet the new conditions?

Not if you depend on G-E copper-oxide rectifier units for plating or anodizing power. You can buy one or more individual units today, reconnect them or combine them with additional units tomorrow, and operate with no sacrifice in efficiency.

G-E plating and anodizing rectifiers are part of a complete line of plating and anodizing *systems* developed by G.E., including manual or completely automatic voltage control. For full information or help in selecting a power-saving plating system, write Section **A5-1170,** Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

(Above) Bank of G-E "500" Rectifiers, showing compact multiple-unit arrangement.

GENERAL ELECTRIC

28th National Metal Congress

Atlantic City, N. J., November 18 through 22

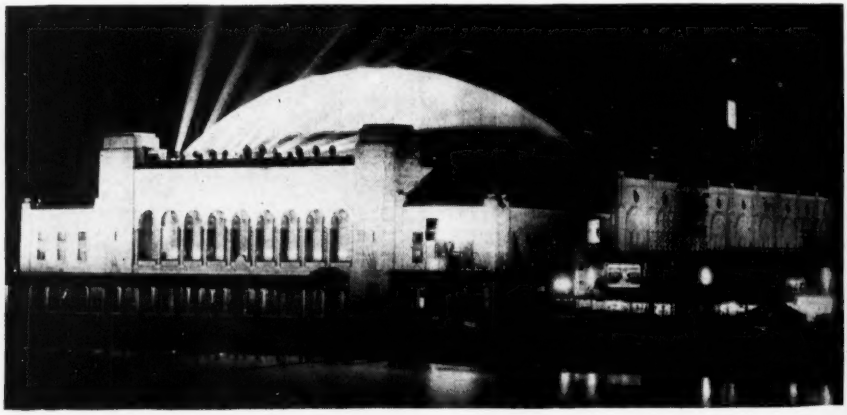
CLOSE to 400 manufacturers of metallurgical and metal-working products will have displays and exhibits covering 250,000 square feet of floor space in Atlantic City's huge Municipal Auditorium when the National Metal Congress and Exposition opens on Monday November 18 for a five-day run.

The 28th National Metal Exposition is being held in the East for the first time in five years. Atlantic City, with its proximity to the large eastern centers of commerce and industry, offers an ideal location, and excellent exhibit facilities are provided by the large and modern Municipal Auditorium. The entire floor space of the main auditorium and of the exhibit hall will be utilized. They are laid out in such a way as to minimize the amount of walking required to view the show.

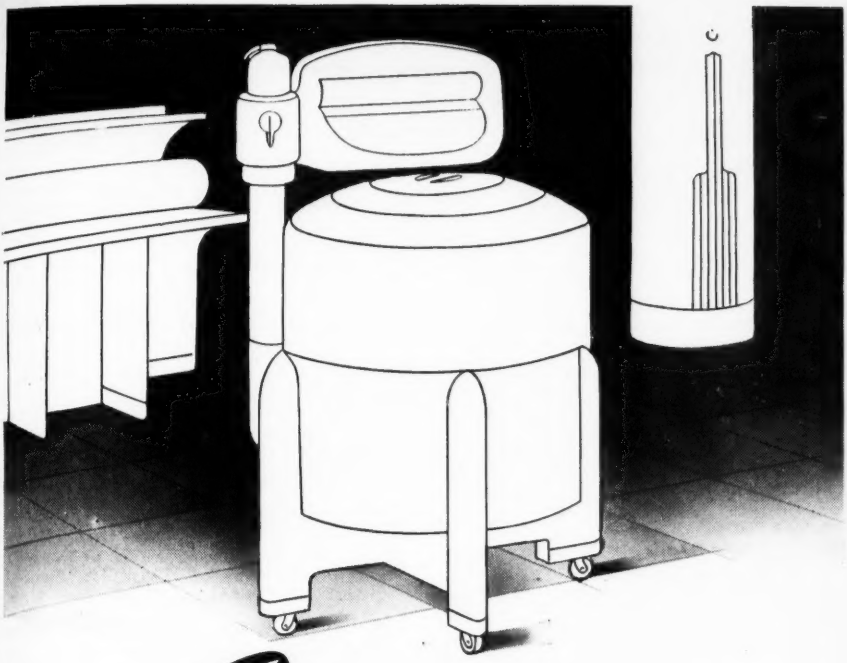
Excellent meeting rooms are also available in the auditorium for the 22 technical sessions and four lecture courses of the A.S.M. Metal Congress program. The auditorium is located directly on the Board Walk close to the Million Dollar Pier (A.S.M. headquarters). Many other large hotels are within equally close distance.

Cooperating societies in the National Metal Congress are the American Institute of Mining and Metallurgical Engineers (Institute of Metals Division and Iron and Steel Division), the American Welding Society, and the American Industrial Radium and X-Ray Society. Technical programs have been planned by these societies.

Advancements in production and manufacturing techniques evolved during the past five years will be seen at the show, many of them for the first time now that wartime restrictions have largely been lifted.



Atlantic City's Municipal Auditorium where the National Metal Congress and Exposition will be held from November 18 through 22



GRANODIZE

FOR PURE WHITE FINISH

Durability and Superluster

Cold SPRAY-GRANODINE prepares metal surfaces for the durable, clear white, lustrous finish—demanded by discriminating housewives—on washing machines, refrigerators, kitchen cabinets and other metal household utilities.

"Granodine"* produces, at low temperature, a uniform zinc phosphate coating that anchors paint firmly to metal for permanent protection and also prevents the spread of rust, from accidental injury. It enables the lustrous finish to hold even where it must take "hard knocks" and under exposure to excessive moisture.

Granodizing is the manufacturer's assurance to dealer and consumer that the beautiful finish of his products will endure.

* Trade Mark Reg. U. S. Pat. Off.

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

NEWS of the Industry

Dollinger Sales Conference

Thirty sales representatives of the Dollinger Corporation from every section of the United States had a preview of new designs of Staynew Filters at a three-day sales conference September 20, 21 and 22. The conference was held at the company's Rochester plant and at Longue Vue, Thousand Islands.

Inspection of the plant and study of manufacturing processes were followed by examinations of new models of Staynew Filters for air and other gases and liquids. These included special high pressure and high temperature pipe line models and large capacity automatic filters for ventilating systems. L. L. Dollinger, Jr. addressed the group on "Ventilation Filters" and K. E. Ellis of the sales department spoke on "Industrial and Liquid Filters."

M & W Buys Smith-Davis Paint Company

The Maas & Waldstein Co., Newark, N. J., manufacturer of specialized production finishes, announces the acquisition of the Smith-Davis Paint Co., 10751 Venice Blvd., Los Angeles 34, Calif. Established in 1923, Smith-Davis will continue to manufacture industrial finishes, trade sales and maintenance sales paints. In addition, the company's retail store for consumer paint will be modernized and enlarged as soon as building materials are available.

C. R. Parry, Pacific Coast divisional manager for many years with M & W, will supervise the new plant and will move his present office and the company's warehouse to the Venice Boulevard address. The field activities will be carried on by combining the sales forces of both organizations, and other personnel will be added at a later date.

Collins to Head Market Research

The appointment of George T. Collins as manager of the Market Research Department of Pennsylvania Salt Mfg. Company has been announced by Richard L. Davies, assistant to the president. Mr. Collins, formerly a chemical engineer in the department, was assistant manager of Market Research when he was promoted. He joined the Pennsalt organization on October 15, 1943.

New Firm Completes Installation

Industrial Powders, Inc., announces completion of its installation at 220 Essex St., Brooklyn, N. Y. The firm is fully equipped for the production of electrolytic copper and copper oxide powders for all metallurgical uses and for the paint, electrical, plastics, chemical, and automotive industries.

G. B. Gusrae, formerly with the Otis Elevator Company, is production engineer of the new firm. Arthur Bass is sales manager.

Joins Metallurgical Staff of International Nickel

J. E. Fifield, formerly with the U. S. Naval Research Laboratory and the American Brake Shoe Company, has joined the Development and Research Department of The International Nickel Company, Inc. He will make his headquarters at the New England Technical Section of the division at 75 Pearl Street, Hartford, Connecticut.

Mr. Fifield graduated from the Massachusetts Institute of Technology in 1940, where he received the degree of B.S. in metallurgy.

Research Fellowships Established

Thirty-nine northern Ohio paint companies are cooperating in the establishment of three graduate research fellowships at Case School of Applied Science to encourage study, research, and development work in paint technology. The Paint firms have underwritten a fund of $15,000 through the Joint Educational Committee of the Cleveland Paint and Varnish Production Club and The Cleveland Paint, Varnish, and Lacquer Association to establish the fellowships for a period of three years, according to Howard E. Wise of The Arco Company, chairman of the Joint Committee.

Industrial Ovens, Inc.

Industrial Ovens, Inc., is the new name of the organization previously known as the Industrial Oven Engineering Company, according to an announcement by C. A. Litzler, president of the new corporation. Simultaneously, the company announces its establishment in a new plant and office building at 13825 Triskett Rd., Cleveland 11, Ohio.

The organization specializes in engineering, designing, and installing industrial heating and processing equipment, wih particular emphasis on continuous operations in the handling of the materials to be treated.

Joins Pennsalt Engineering Department

Joseph H. Fulmer, formerly connected with the Ethyl Corporation and Sharples Chemicals, has joined the engineering department of Pennsylvania Salt Mfg. Company. Mr. Fulmer was graduated from Bucknell University in 1923 as a chemical engineer and is a member of the American Chemical Society and the Masonic order.

James G. Mowry Retires

According to an announcement made by the Pittsburgh Plate Glass Company, James G. Mowry has been retired after 45 years' association with the company's paint division. The major part of Mr. Mowry's 45 years of service with Pittsburgh Plate has been utilized in servicing the railway and petroleum industries. His headquarters since 1904 has been in New York City.

With the retirement of Mr. Mowry, the company announces that the sales of railway industrial finishes in the eastern territory will now be handled out of offices in New York, Baltimore, and Pittsburgh. Glenn N. Stanford will handle the sales from Baltimore, John Leonard will handle sales from New York, and Jack A. Burke will handle the Pittsburgh territory.

New plant of Industrial Ovens, Inc.

H-VW-M Expands Facilities

The Hanson-Van Winkle Munning Co., Matawan, N. J., announces the opening of a new office and warehouse at 382 Seymour St., Stratford, Conn. George G. Knecht, who has served many years in the Connecticut territory, has been appointed manager of this office. Walter J. Jurman has been transferred from the Chicago office to take charge of the warehouse in Stratford.

Robert M. Norton, who has represented the Hanson-Van Winkle-Munning Company in New York State, with headquarters at 32 Academy St., Skaneateles, has been promoted to the post of district manager of the company and will be responsible for all field operations in the State of New York with the exception of New York City and its suburbs.

Glenn M. Herring

Glenn M. Herring has returned to the Pittsburgh office of the company in the Oliver Building. Recently released from the Army Air Forces with the rank of major, Mr. Herring is a graduate of Lafayette College with the degree of B.S., having majored in economics.

The Hanson-Van Winkle-Munning Company announces the closing of the Elkhart, Indiana office and the transfer of Walter R. Lockwood to Anderson, Indiana, where he will be in charge of the new and larger sales office.

Moves to Larger Quarters

The Enterprise Paint Mfg. Co., Chicago, has moved into new and considerably larger quarters, combining its two plants, Enterprise and Federal, under one roof. The new plant, located on South Ashland Avenue at 29th Street, contains the latest equipment for the manufacture of paints and varnishes. New laboratories are provided for analyzing raw materials for standards of quality, for checking each manufacturing process and for testing finished products, and a special laboratory is maintained for research and new product development.

The plant is located so that shipments may be made by truck, rail, and boat. Close attention has been given to employee welfare. Lighting facilities to relieve eyestrain and fatigue, rest and recreation rooms, showers, and other conveniences are provided, and the offices are air conditioned for comfort.

New P&G Vice President and General Manager

Directors of The Procter & Gamble Company at the annual organization meeting held recently in Cincinnati elected Neil H. McElroy to fill the newly created position of vice president and general manager.

Mr. McElroy has held the position of vice president and since last March has served as assistant to the president. He became manager of the Promotion Department in 1929 and was named manager of advertising and promotion in 1940. In 1943 he was elected to the board of directors and named vice president in charge of advertising and promotion.

Optimus to Manufacture Vapor Degreasers

The Optimus Equipment Co., 133 Church St., Matawan, N. J., Manufacturer of metal washing and drying equipment, announces the manufacture and marketing of a complete line of metal parts and degreasers in standard and special models. The new equipment will include degreasers for a wide range of applications. Machines will be available embodying a varied number of cleaning cycles, including vapor, vapor-spray, liquid-liquid-vapor, and liquid-vapor, as well as combinations of these and the use of supplementary pumping and spray washing facilities to meet special requirements.

Forms Affiliate Organization

The Atlas Mineral Company, manufacturer of acid and alkali-proof cements, acid and alkali-proof floors, plastic linings, jointing materials, and protective coatings, announces the formation of an affiliate organization, The Atlas Mineral Products Co. of Texas, Inc., P. O. Box 252, Houston 1, Texas.

The new affiliate organization includes a manufacturing plant for sulphur cements and other firm products and will handle the sales of Atlas products in the territory west of the Mississippi, with the exception of Minnesota, North Dakota, and eastern Missouri. It will also handle sales in western Tennessee, Mississippi, and Louisiana.

Du Pont Sales Engineer

The appointment of Frank P. Smith as a sales engineer in the Cleveland region is announced by E. I. du Pont de Nemours & Company. Mr. Smith reports to W. E. Kreuer, regional industrial sales manager in Cleveland, and will be located at 601 E. Robinson St., Pittsburgh. He will serve the clientele formerly served by W. J. Bradley for the Du Pont Finishes Division.

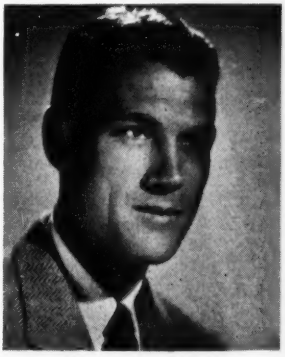
Since his return a year ago from duty

Frank P. Smith

with the U. S. Navy, Mr. Smith has worked in the Philadelphia area. During the war he was supervisor of the paint laboratory of the U. S. Naval Air Experimental Station in Philadelphia. A graduate of Girard College, Mr. Smith came to the Du Pont Company as a clerk in the analysis department of the Philadelphia office. He spent four years in the Philadelphia Finishes Laboratory and six years as a special industrial sales correspondent in the Finishes Division.

Eugene C. Bosl Joins H-VW-M

The Hanson - Van Winkle - Munning Company announces the appointment of



Eugene C. Bosl

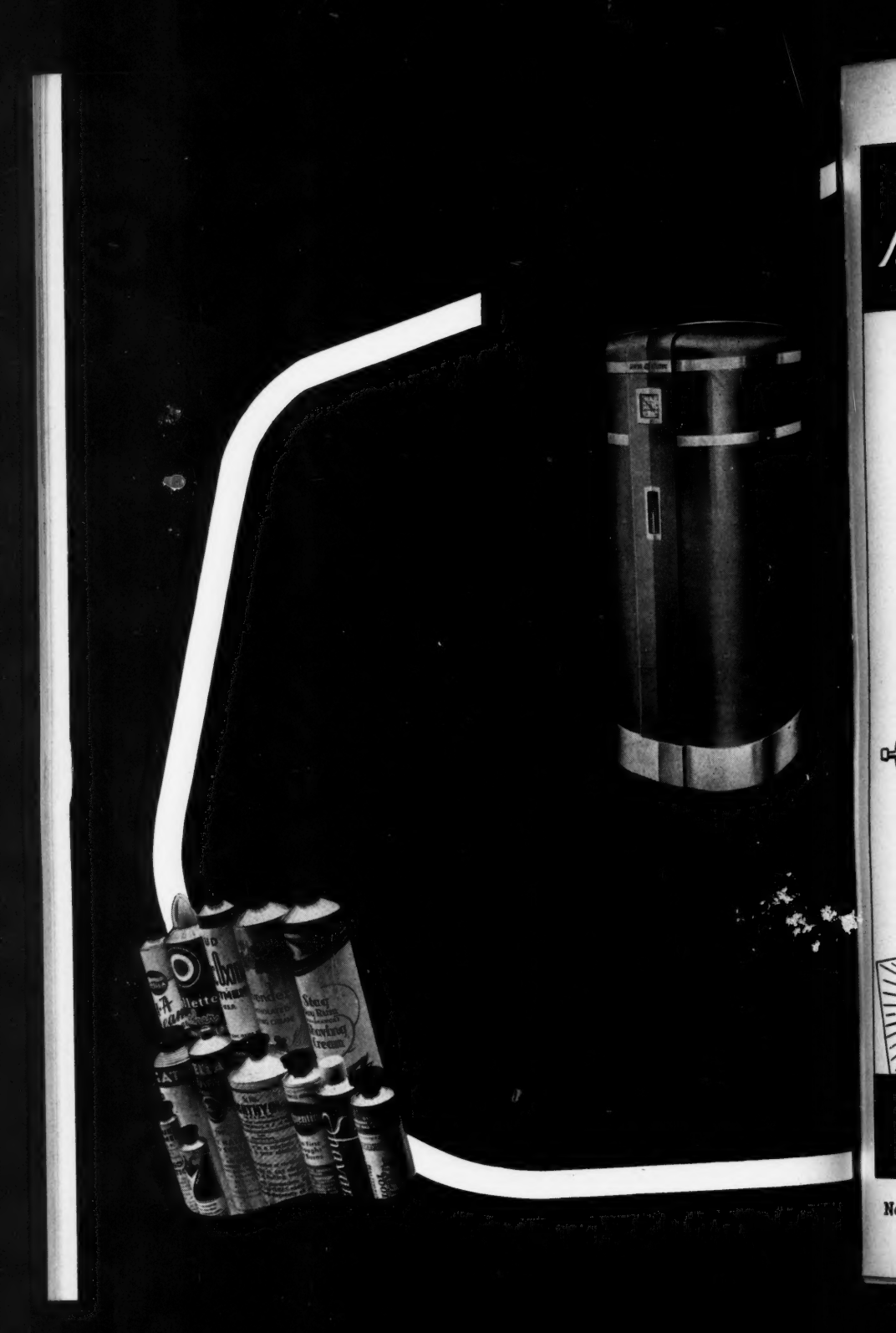
Eugene C. Bosl as a sales representative. He is now located in the Milwaukee office of the company after an intensive training program at Matawan.

Mr. Bosl is a graduate of the Milwaukee State Teachers College, with the degree of bachelor of education in chemistry. Prior to coming with the Hanson-Van Winkle-Munning Company, Mr. Bosl served as a lieutenant in the U. S. Navy and before the war he was an instructor in chemistry at a Milwaukee school.

To Handle Iridite Sales

The Mitchell-Bradford Chemical Co., 2446 Main St., Stratford P. O., Bridgeport, Conn., has been appointed exclusive distributor for the sale of Iridite in the New England area by Rheem Research Products, Inc., manufacturer of the Iridite process.

The area granted to Mitchell-Bradford includes the states of New York, Connecticut, Rhode Island, Massachusetts, Maine, New Hampshire, and Vermont.



Meet the PESCO *Man!*

"If it's Metal Finishing Equipment and Supplies, WE HAVE IT."

PLATING EQUIPMENT and SUPPLY CO.

182 GRAND STREET • NEW YORK 13, N.Y. • CAnal 6-3010

FINISH which imparts good looks and salability to your products . . .

FINISH which provides long-lasting protection to your products . . .

FINISH which economically meets your special requirements . . .

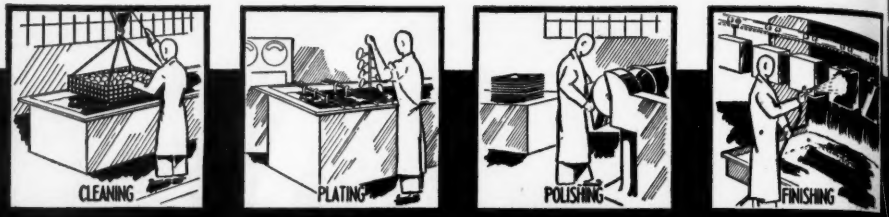
These are qualities you always can take for granted when the finish you use is Egyptian. Your inquiry concerning any finish problem is invited.

THE EGYPTIAN LACQUER MANUFACTURING COMPANY

SPECIALIZED PRODUCTION FINISHES

P. O. BOX 444, NEWARK, N. J.

1946



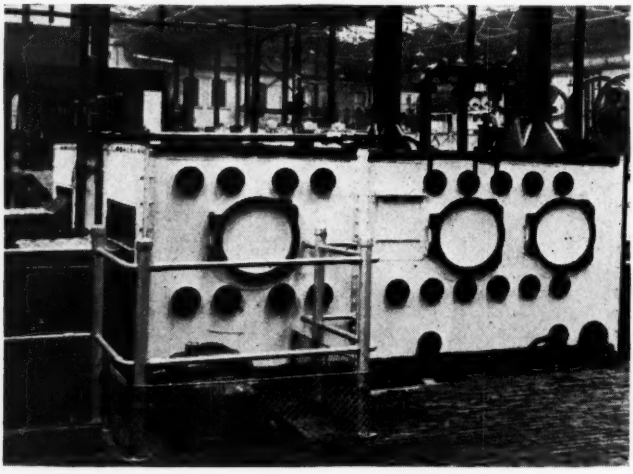
New Equipment and Materials

Goodrich Spray-Type Continuous Pickling and Washing Machine

A spray-type machine for the continuous pickling and washing of metal parts requiring surface preparation for the application of enamel or other coatings, including electroplated coatings, or for the removal of scale is announced by The B. F. Goodrich Co., Akron, Ohio. In operation, workpieces are fed onto a conveyor at the entrance to the machine and carried through the spraying and washing cycles, emerging acid free and ready for the succeeding operations.

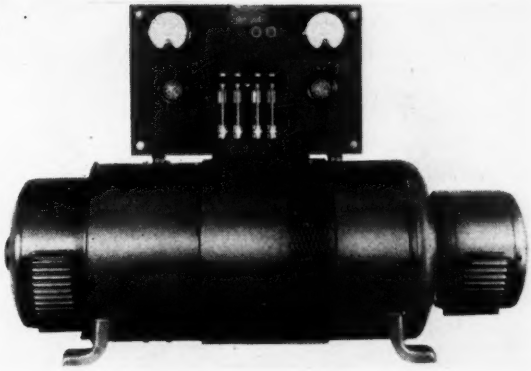
The Goodrich Spray-Type Continuous Pickling and Washing Machine features straight-line operation whereby materials are fed into the conveyor feeding into the machine and carried automatically through each pickling and washing operation without intermediate handling. The conveyor is designed to carry any size or shape of part within the overall size limits of the unit. The spray principle utilized by the machine is said to provide for the unusually fast and thorough removal of scale and foreign material from workpieces.

Flexibility of operation is possible since the unit can be designed to fit practically any requirements with different sizes and varying numbers of compartments



Goodrich Spray-Type Continuous Pickling and Washing Machine

MGC Model No. 130 Low-Voltage Electroplating Generator



for washing and pickling solutions. Durability of the machine is said to be assured by the strength of construction on prepared foundations so that the complete system will withstand shocks and hard usage. Acid-resisting compounds are used to line the all-welded steel tank spray compartments, conveyor rollers, and pipes and fittings, thus assuring long trouble-free service, reduced maintenance, and long life, the manufacturer claims. Maximum safety in operation is said to be ensured through the confinement of all acid and acid fumes in the chamber.

MGC Low-Voltage Electroplating Generator

The Motor Generator Corp., Box PF 96, Troy, Ohio, announces a low-voltage electroplating generator which is available in six models ranging in size from 100 amperes at 6 volts to 2,000 amperes at 6 volts or 1,000 amperes at 12 volts. The model No. 130 illustrated herewith is rated at 1,000 amperes at 6 volts or 500 amperes at 12 volts. The generator is driven by a 10 h.p. motor at 1,200 r.p.m. This model is said to be ideal where still plating tanks are used for nickel, copper, brass, or cadmium. The standard tank size normally used with this model is 6 feet x 30 inches x 30 inches or a tank containing approximately 250 gallons of solution. For chromium plating, individual 1,000-ampere 60-volts generators are used right at the tank.

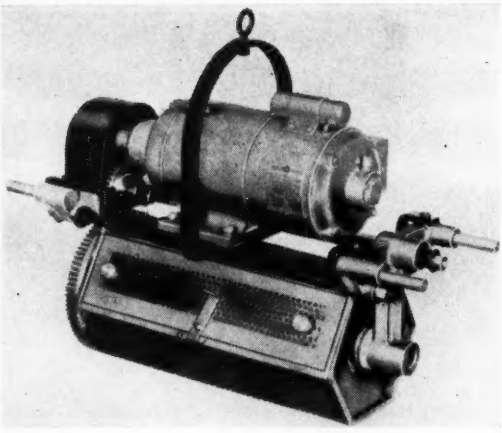
As a result of the double-commutator design of the MGC Low-Voltage Generator, the commutators can be connected in series to obtain 12 volts or less for barrel plating, electrocleaning, and so on. Due to the large size, the machine is compound wound and equipped with interpoles or commutating poles which are said to ensure sparkless commutation. Special metallic brushes carry the high current with minimum loss. In addition, the commutators are provided with riveted risers which cause a marked draft, thus ensuring cool commutation. Another special feature is separate excitation of the generator fields to assure maximum plating characteristics.

"Chemoxiding" Process

The Technical Processes Division of Colonial Alloys Co., Philadelphia 29, Pa., announces a process for chemically finishing aluminums, to be known as "Chemoxiding." With the process, all of the aluminums and aluminum alloys can, it is claimed, be easily, quickly, and economically processed to produce beautiful lustrous glossy finishes which are relatively hard and of excellent corrosion resistance. No paints, enamels, or lacquers are required.

The processing cycle of work includes a short period of degreasing and cleaning, Chemoxiding, and rinsing. Colorings obtained range from a light gray through marbelized to light brown, depending upon the timing and alloys of aluminum used.

Chemoxiding is claimed to be especially practical as a finishing process (1) in connection with sheets, tubes, extrusions, and rods after fabrication; (2) where assemblies of different alloys must be processed; (3) when inserts of steel, brass, or copper are present; (4) where it is desirable to penetrate within deep recesses (as for example inside of tubes) and protect all surfaces; (5) when a dielectric value is required; (6) where no dimensional changes are permitted; (7) where a good base for paints and lacquers is desired; (8) where no paints or lacquers are required or desired; (9) when brazed aluminum assemblies must



H-VW-M Mercil Portable Plating Barrel

be processed; and (10) when polishing is not required.

H-VW-M Mercil Portable Plating Barrel

The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a portable plating barrel which is designed for small quantities of work and which is readily movable to any location as needed. Designated as the H-VW-M Mercil, the unit can be furnished with a steel cylinder for cleaning, with a Monel cylinder for pickling, or with a rubber or Bakelite cylinder for plating.

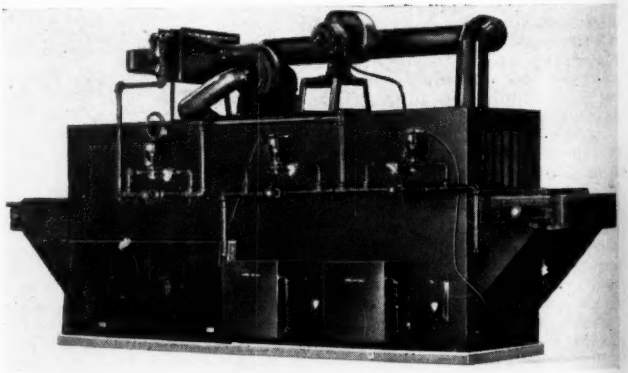
The cylinder for cleaning or pickling is 8 inches in diameter x 18 inches long. The apparatus is furnished with a special Janette motor-reducer to drive the cylinder at 1.6 r.p.m. The motor is totally enclosed and mounted on the tie-rod assembly directly above the cylinder. The unit with the steel cylinder can also be used for tanks containing solution for black oxide finishes such as Jetal.

The unit for plating has chain dangler contacts and can be used with a cylinder 6 inches in diameter x 12 inches long or 8 inches in diameter x 18 inches long. The Janette motor and reducer are arranged so that a cylinder speed of 5 to 6 r.p.m. can be obtained. A cable is attached to the live end of the hanger so that the user can easily attach it to the negative bus bar on the still tank.

The overall length of the portable unit with the 6 x 12-inch cylinder is approximately 20 inches, while the height is approximately 16 inches and the weight approximately 70 lb. A cylinder of this size is designed to hold about two quarts of work. The equipment is supplied with pins in the hanger arms, as in the regular Mercil type cylinder. The user can arrange to provide saddles on the tank into which the cylinder with the pins can be placed.

Optimus Flat Conveyor Spray Washer

A flat conveyor type spray washing machine adaptable for cleaning and simi-



Optimus Flat Conveyor Spray Washer

lar spray operations, as well as for drying, has been announced by the Optimus Equipment Co., 133 Church St., Matawan, N. J. The machine is designed to rapidly spray any parts which may be handled either in baskets, on racks, or simply laid on the conveyor.

According to the manufacturer, the Optimus Flat Conveyor Spray Washer can be adapted to many different and difficult problems, with little labor required for loading or servicing. Alkaline, acid, solvent type, air drying, oil spray, and many similar operations can be handled. Any type of heating can be employed, and the machine is available in various sizes with any variety of horizontal conveyor.

The Optimus Flat Conveyor Spray Washer features a long horizontal tunnel located on top of a series of solution tanks. A continuous flat conveyor runs the length of the tunnel, carrying parts through a series of operations. Solutions are forced on the parts through a battery of spray nozzles by means of a powerful pump. The machine is self-contained but may be connected to other equipment featuring conveyor-moved operation, thus reducing parts handling to a minimum.

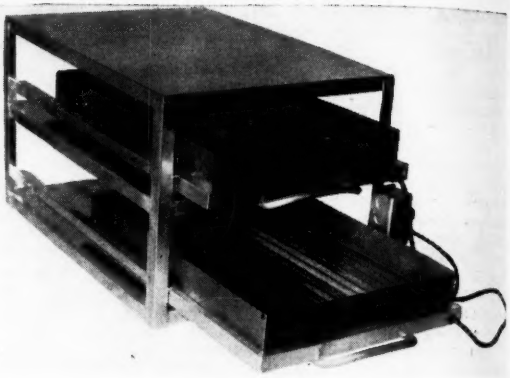
Lustrebright Improved Bright Nickel Process

Featuring improvements which provide for increased operating efficiency, the Lustrebright Improved Bright Nickel Process now being offered by the W. C. Brate Co., 16 Market St., Albany, N. Y., is said to produce brilliant, lustrous, adherent deposits without subsequent color buffing or burnishing on all sizes and classes of highly colored work. Easy to control, the process is claimed to afford an ideal base for chromium, eliminating color buffing, recleaning, and reracking prior to the application of the chromium plate.

Designed to provide zinc die castings with a bright nickel deposit that may be chromium plated, the Lustrebright Improved Bright Nickel Process is claimed to be unharmful to nickel plating solutions of standard formula and to produce deposits that are not streaky and will not peel or become brittle. Described as having excellent throwing power, the process requires no special equipment but may be employed in still tanks, mechanical barrels, or automatic machines to obtain uniform results.

Speedy, Uniform Plating
For all applications
MGC
equipment is best.
If you have a plating problem—whether it's large scale production, or experimental—you'll find that it can be finished easier, faster and with greater profit if you use MGC Motor Generator Sets. They're available in a wide selection of models for every plating requirement.
Special windings, ball bearings, compact single unit — are just a few features of MGC Motor Generator Sets that offer longer life, with maximum efficiency and economy. MGC Buffers and Grinders—specially designed for plating applications. Write for details on the complete line.
Motor Generator Corp., Box PF-116, Troy, Ohio
(Division of Hobart Brothers)
MGC "One of the World's Largest Builders of Electric Generators"

Calesco Preheater



Calesco Preheater

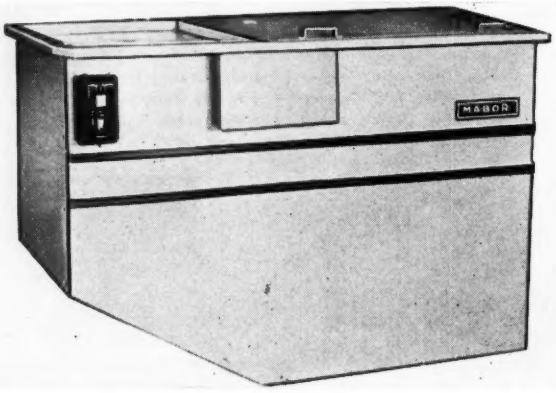
Designed for applications requiring thermoswitch-controlled low temperatures within a plus or minus variance up to 380 deg., the Calesco Preheater shown herewith has been developed by the Delt-Calesco Co., Far Hills, N. J. The unit is said to be particularly useful in dehydrating industrial materials and in drying paints and metal finishes.

The Calesco Preheater is open on all sides to permit released moisture to be dissipated and not confined to processing materials. The drawers of the unit are separtely removable from two sides. An Infra-Lectric Plate consisting of aluminum-carbon alloy elements fused into tempered glass forms the bed of each drawer, thus providing for allover even plate temperatures. Materials may be placed above or below the plate or rest directly on the surface.

Mabor Dip-Agitor

A dip-agitating machine for metal cleaning has been developed by the Mabor Co., Walnut St., Clark Township, Rahway, N. J. The drive mechanism, which is mounted in a removable frame, utilizes only two bearings and balances the weight of the parts by means of a knee that rests next to the bottom of the equipment, outside of the tank. According to the manufacturer, the drive mechanism does not impose stress on any part of the machine, even when fully loaded, and can be removed, replaced, or cut off.

Sturdily built, the Mabor Dip-Agitor can be operated at high speed, handling a heavy load or a light load quickly and easily. Built in many standard sizes for wash and rinse, as well as in special dimensions, the machine can be heated with steam, gas, oil, or electricity.



Mabor Dip-Agitator

M & W "Flashdur" Finishes

Synthetic enamels and clear finishes that are designed to bake in a matter of seconds have been developed by the Maas & Waldstein Co., Newark 4, N. J. The products, known as "Flashdur," are intended to help reduce production schedules to a minimum by affording hard, tough, extremely fast baking finishes to manufacturers of metal products, such as instruments, compacts, lipstick cases, lighters, cigarette cases, and so on.

Flashdur is available in clear, black, white and most colors.

Chlorimet Nos. 2 and 3 Corrosion-Resisting Alloys

The Duriron Co., Inc., Dayton 1, Ohio, announces the development of two nickel-base corrosion-resistant alloys designated as Chlorimet No. 2 and Chlorimet No. 3. Chlorimet No. 2 consists primarily of nickel and molybdenum which combine to provide an alloy that is described as having excellent mechanical properties and resistance to the corrosive action of numerous acids, particularly hydrochloric in all concentrations and temperatures, including boiling. Chlorimet No. 2 is also said to afford excellent service in sulfuric acids of 35 to 60 per cent concentration at temperatures up to and including boiling. Moreover, it is recommended for sulfuric acid between 60 and 100 per cent at temperatures not in excess of 176 deg. F. Excellent for hot sulfuric acid under reducing conditions, the alloy is further claimed to efficiently handle wet hydrogen chloride gas.

Chlorimet No. 3 consists primarily of nickel, chromium, and molybdenum, a combination which is said to provide an alloy having excellent mechanical properties and unusual resistance to most acids, particularly under oxidizing conditions. According to the manufacturer, Chlorimet No. 3 safely handles hot sulfuric acid solutions in concentrations less than 35 per cent and at temperatures up to 176 deg. F. It is also said to withstand ammonium chloride, sodium chloride, zinc chloride, nickel chloride, and hypochlorite bleaches (at room temperatures not over 105 deg. F.).

Chlorimet No. 2 and Chlorimet No. 3 are available in the form of engineered equipment such as pumps and valves.

"Dustkop" Improved Model 1150 Dust Collector

Improvements in the "Dustkop" Model 1150 Dust Collector which are designed to increase its efficiency under the extremely heavy dust loads associated with production buffing and polishing work are announced by the Aget-Detroit Co., First National Bank Bldg., Ann Arbor, Mich. Though still retaining the combination of cyclone separator and spun glass filter as first and second stage air cleaners, the unit includes three new features; namely, a high compression filter, a new type

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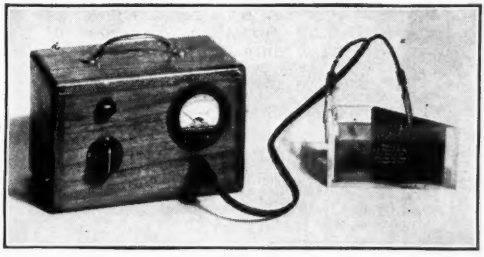


HULL CELL TEST SET

SEE IT PLATE AND COVER!

(For solutions up to 165° F.)

IF YOU PLATE

Brass, Cadmium, Chromium, Copper, Nickel, Silver, Tin, Zinc

YOU CAN'T AFFORD NOT TO USE THE HULL CELL

To Control Your Plating Baths

ROHCO

R. O. HULL & COMPANY

1279 West Third Street

Cleveland 13, Ohio

"YOUR PLATING IS BEST WITH THE HULL CELL TEST"

filter seal, and a cyclone stack deflector.

The high compression filter has the effect of stopping all the particles of lint and polishing dust at its source rather than permitting partial entry into the filter as in the case of dry grinding dusts which could be shaken out by the hand crank. As the result, the light lint and dust which are not taken out of the air stream by the cyclone form a mat on the underside of the cylinder. This mat is allowed to build up and, in so doing, automatically becomes a filter of its own, stopping additional dust and lint. When sufficient thickness of mat has been formed, the suction at the intake hood diminishes. This is evidence that the mat should be removed.

Removal of the mat is accomplished by shutting off the power, lifting up one end of the filter assembly, and simply stripping off the mat of dust and lint and discarding it. The cylinder is then latched back into position and the unit is ready for service.

While the light additional pressure created by the use of the higher compression filter is so nominal that it is difficult to measure with standard air measurement instruments, a sponge rubber seal is provided at the filter edge to ensure an effective seal at all times. A deflector positioned at the outlet of the cyclone stack distributes the dust-laden air uniformly so that there is no direct stream of air against any single area of the filter, thereby permitting the mat of lint to form evenly and uniformly over the underside of the filter.

"Dustkop" Improved Model 1150 Dust Collector

You wouldn't ship a DIAMOND *in a box of...* GRAVEL

Why try to protect finely machined parts with any old rag or paper?

PRECISION
Dust Caps & Thread Protectors

Save their low cost in time alone! No hunting around. ***Efficiently*** safeguard parts inside and out, from rust, dust, moisture, grit, and rough handling. For all shapes.

Send for samples.

PRECISION PAPER TUBE CO.
2053 W. Charleston St. Chicago 47, Ill.

Enthone Brass Cleaner

Enthone, Inc., 442 Elm St., New Haven 2, Conn., has developed an alkali cleaner to be known as Enthone Brass Cleaner. According to the manufacturer, the cleaner has high detergent characteristics and, in addition, has no tarnishing action on active metals, including copper, brass, bronze nickel, silver, tin, and lead, thus making it useful as a general plating room cleaner for the cleaning of steel and the metals listed.

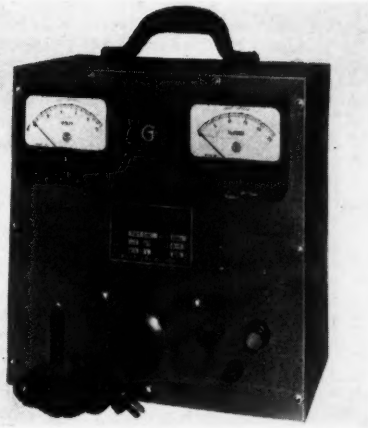
Claimed to possess high detergent qualities for soak or electrolytic cleaning, Enthone Brass Cleaner can also be used for scrub cleaning since it does not contain strong alkalis. A feature of the cleaner is the long life during operation due to stable surface active materials and buffered alkali balance.

Green Model No. 725S1C Portable Bench Rectifier

Designated as the Model No. 725SIC, a bench type rectifier featuring unusually lightweight and portability, thus making it ideal for laboratory and industrial applications, as well as for battery charging, has been announced by the W. Green Electric Co., Inc., 130 Cedar St., New York, N. Y. A complete d.c. power supply source with a capacity of 150 watts, the rectifier has cabinet dimensions of 14 x 14 x 9 inches and weighs approximately 45 lb. The output is adjustable from 0 to 6 volts and has a continuous capacity of 25 amperes.

Having no moving parts and designed to operate noislessly, the Model 725SIC is convection cooled and has a single-phase full-wave circuit utilizing a quadruple protected selenium rectifier element of practically unlimited life. A heavy duty rubber cord and plug are incorporated to match any standard a.c. outlet, and the rectifier is equipped with an on-off switch of the magnet circuit breaker type which provides input protection.

Additional features of the unit include a panel-mounted fuse in the d.c. circuit to provide output protection; pilot lamp with removable jewel for lamp replacement; continuous range voltage control



Green Model No. 725S1C Portable Bench Rectifier

Save COSTLY PRODUCTION TIME

PANOCO Die-Cut MASKING TAPE

CUT TO YOUR OWN SPECIFICATIONS
ANY SIZE . . . . . ANY SHAPE

ELIMINATES REWORK AND TOUCH-UP TIME

Protect surfaces in spraying, plating, buffing and polishing operations, this modern, easy way. Speed work preparation.

RESISTS HIGH TEMPERATURES

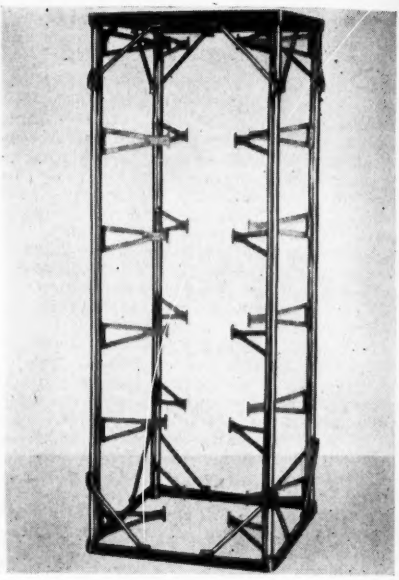
PANOCO MASKING TAPE DIVISION OF PAPER NOV. MFG. CO.
505 CARROLL STREET, BROOKLYN 15, N. Y.

transformer; large voltmeter with accuracy rating of two per cent full scale, connected across the output terminals and with matching ammeter that indicates output current; and color-coded output terminals to facilitate connection.

Stanwood Fixture for Enameling Tank Heads

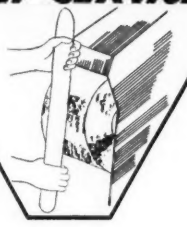
Extra service life, convenience, and thorough circulation of heated atmospheres are said to be provided by an extremely lightweight fixture designed by the Stanwood Corp., 4819 W. Cortland St., Chicago 39, Ill., for handling dished tank heads for hot water heaters through procelain enameling furnaces. The fixture is constructed to hold six tank heads, each of which is supported at only four points so as to minimize bearing surfaces and permit thorough circulation for complete heating of all surfaces. Tank heads can be inserted from any side of the fixture as a result of its open design.

The Stanwood Fixture is reversible for "double duty" service. As soon as stresses set up warpage in one direction, the fixture is simply inverted. The fixture is of strong welded construction of Inconel tubing and special high nickel-chromium frame and brackets.



Stanwood Fixture for Enameling Tank Heads

GRAINLOCK CEMENT
WITH SERVICE!



Ask for a demonstration by our distributor in your locality

Allied Industrial Products Co. - - - - - Chicago, Illinois
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Lea Manufacturing Co. - - - - - Waterbury, Connecticut
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Abrasive Tool & Supply Co. - - - - - Cleveland, Ohio

INDUSTRIAL LUBRICANTS CO., INC.
5736 TWELFTH ST DETROIT 8, MICH.

Panoco Masking Tape

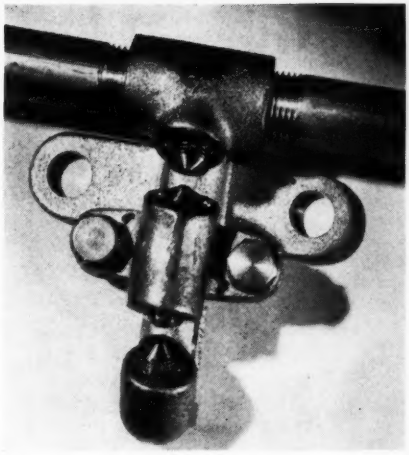
A die-cut masking tape which is claimed to be particularly useful in finishing operations is now being supplied in any shape or size to meet individual requirements by the Panoco Masking Tape Division, Paper Novelty Manufacturing Co., 505 Carroll St., Brooklyn 15, N. Y. Its ease of application is said to speed up production as it protects surfaces in plating, painting, buffing, and polishing operations.

According to the manufacturer, Panoco Masking Tape is now being widely used in the manufacture of compacts, vacuum cleaners, electric irons, and numerous other items where surface protection is important during assembly. The tape is designed to resist high temperatures and to protect surfaces from screw driver mars, wrench scratches, and so on, thereby reducing reworking and touch-up time to a minimum.

Screening Nozzle for Kidde Carbon Dioxide Fire Extinguishing Equipment

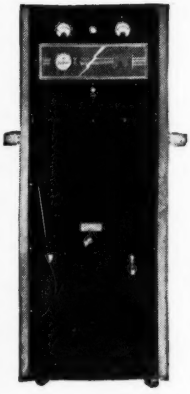
For added fire protection, a screening nozzle which is designed to cut off or "screen" a fire's oxygen supply is now available for use with standard carbon dioxide fire extinguishing systems manufactured by Walter Kidde & Co., Inc., Belleville, N. J. The compact nozzle is said to effectively keep down the oxygen content of air in rooms or enclosures which are not completely closed off from adjacent parts of industrial plants. Open-end cleaning booths, dip tanks, and fan openings are examples of areas which often require screening when fire breaks out since in-drafts often suck air to the blaze, feeding the flames.

The Kidde Screening Nozzle is designed to throw a curtain of carbon dioxide across openings and is arranged for operation in conjunction with a built-in extinguishing system, using the same high-pressure gas supply and piping. The screen provided by the nozzle is a double one. One blast of snow-white gas shoots straight across the opening, while a second series of jets aims at an inward angle to dilute air which gets past the first screen. According to the manufacturer, the nozzle not only screens a fire's oxygen supply but also tends to stop the fire from spreading to nearby areas.



Screening Nozzle for Kidde Carbon Dioxide Fire Extinguishing Equipment

ELECTROPLATING *becomes scientific with the*



R - A SELENIUM RECTIFIERS!

9 volts.....2000 amperes	6 volts.....2000 amperes
9 volts.....1000 amperes	6 volts.....1500 amperes
9 volts.....1500 amperes	6 volts.....1000 amperes
9 volts..... 500 amperes	6 volts..... 500 amperes
18/9 volts....500/1000 amperes	12/6 volts....500/1000 amperes

Make your selection of these completely self-contained Selenium Rectifiers with meters, off-on switch and stepless variable control. Standard units can be used in multiple arrangements to obtain 5000 and 10,000 amperes or higher.

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Rectifier Division

RICHARDSON-ALLEN CORPORATION

15 West 20th St., New York 11, N. Y.

Eclipse "46" Heavy Duty Spray Gun

The Eclipse "46," a heavy duty spray gun designed specifically for the application of very heavy materials at high speed, is announced by the Eclipse Air Brush Co., 424 Park Ave., Newark 7, N. J. Said to require minimum air volume

Eclipse "46" Heavy Duty Spray Gun

and pressure consistent with the job for which it is intended, the gun, according to the manufacturer, easily handles roofing compounds, fibrated bitumastics, emulsified asphaltums, and other ordinarily difficult-to-spray materials.

The fluid connection is a standard ¾-inch pipe thread. From this point to the fluid outlet is a 45-deg. angle, thus providing for an unrestricted flow of material. The fluid valve has an ½-inch travel so as to eliminate obstructions when the gun is wide open in operation.

The Eclipse 46 Spray Gun is said to be extremely fast in action and is built for rugged, heavy duty use.

RANDALL for TANKS

ALLOY — RUBBER — LEAD

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—DEGREASERS—

POLISHING LATHES

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RANDALL WELDING WORKS

410-412 E. 93rd St. New York 28

"Lithcote" Corrosion-Resistant Coating

"Lithcote," a multiple-coat non-vitreous enamel-like finish which is especially applicable to fields where the corrosion of equipment is an important impediment to production, is now being marketed by the Bedford Development Corp., 230 Park Ave., New York, N. Y. In addition to use on pulp and paper mill equipment, the coating can be applied to food processing equipment, pharmaceutical tanks, process and storage equipment, petroleum tanks, chemical tanks and tank cars, and so on.

Lithcote is sprayed on equipment and baked, producing a non-porous, glass-like surface. Usually only hot water and a brush are said to be required to clean equipment that has been Lithcote-treated. However, steam sterilization may be utilized where necessary.

Manhattan Flexible Polishing Wheel

The Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., announces the addition of a flexible polishing wheel to its line of Manhattan polishing and finishing wheels. According to the manufacturer, the unusual flexibility and "cushion" action of the wheel is due to the fact that the wheel is bonded with a special modified compound of Neoprene impregnated with abrasive grain. Depending on its ultimate application, the wheel can be varied over a wide range of densities.

Featuring a combination of porosity and soft bond which is said to provide for the production of excellent finishes, the Manhattan Flexible Polishing Wheel, due to the nature of its soft bond, is recommended for operation at a speed not in excess of 3,000 s.f.m. The wheel can be used for finishing stainless steel, non-ferrous and precious metals, and is supplied in the finer abrasive grain sizes or with pumice, rottenstone, or other mild abrasives. Blocks and rubbing pads made of the same composition as the wheel can also be obtained.

"Krink-A-Lac"

The Western States Lacquer Corp., 5000 E. Washington Blvd., Los Angeles 23, Calif., announces the development of "Krink-A-Lac," a paint product having the appearance of a wrinkle finish but requiring no heating or baking or special gun for application. The material can be applied with ordinary spray equipment to metal, plastic, and other types of surfaces using 30 to 40 lb. air pressure on the nozzle and sufficient feed pressure to blow the lacquer out at the desired feed rate with the needle valve of the gun wide open.

According to the manufacturer, Krink-A-Lac air dries in 30 minutes and is ideal for covering rough or imperfect surfaces and for producing a "wrinkle" finish on objects that cannot be safely or conveniently subjected to the heat of a baking oven. Specific uses include the covering of rough metal surfaces of castings with a hard, attractive finish that is said to resist chipping, as well as enriching the appearance of metal products and toys. Another important application of the material is a "safety tread" on ladders, scaffolds, and so on, where its long wearing wrinkle finish is claimed to minimize the risk of slipping or falling.

Krink-A-Lac is available in 17 colors, including variations of most standard colors, plus metallic silver and gold. For added appeal and ease of cleaning, a clear lacquer may be sprayed over Krink-A-Lac. In addition, novel effects may be obtained by wiping with various colors in oil to produce attractive two-tone combinations and unique variations before spraying on the clear gloss or flat lacquer.

Foamite Airfoam-Generating Nozzle

Measuring only 2½ inches in diameter at the widest part of the barrel, a foam-making nozzle for fire fighting, to be known as the Foamite Airfoam-Generating Nozzle, is now being manufactured by the American-LaFrance-Foamite Corp., Elmira, N. Y. Fast in action, easy to operate, and light in weight, the nozzle mechanically creates air foam through a scientific mixing of water, air and Foamite Airfoam liquid within the nozzle and discharges the combined ingredients through the tip.

The Foamite Airfoam-Generating Noz-

Hammond of KALAMAZOO

BACKSTANDS
CONVERT
GRINDERS-POLISHERS
into high production
ABRASIVE BELT UNITS

Hammond Variable Speed Polishing Lathe and No. 3 Backstand installation.

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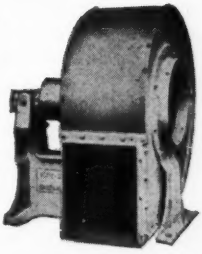
Low Power
EXHAUST FANS

When economy counts, DIXIE LOW POWER EXHAUST FANS assure long service under heavy loads. Every installation is guaranteed to give satisfactory performance —



Write for Complete Details

DIXIE
MFG. CO., INC.
1310 Russell St. Baltimore, Md.

Foamite Airfoam-Generating Nozzle

zle is said to be especially ideal for extinguishing fires in flammable oils, paints, varnishes, and so on. It is a dual-purpose nozzle since it can be operated for either a foam stream or clear water stream at the option of the operator by simply removing the pickup tube from the Airfoam liquid.

Harrison 4-A Products

SUPERIOR COMPOUNDS

for

Cutting—Cut and Color
Mirror Finishing
Mean

FASTER CUTTING
INCREASED PRODUCTION
GREATER ECONOMY

Write us for samples to meet your special needs

HARRISON & COMPANY
Haverhill, Mass.

Devoe Brush Shampoo

Said to be equally efficient for removing hardened paint, lacquer, varnish, shellac, or enamel from paint brushes, a cleaner to be known as Devoe Brush Shampoo is now being marketed by the Devoe & Raynolds Co., Inc., 44th St. and First Ave., New York 17, N. Y. Easy to use and having a pleasant odor, the cleaner, according to the manufacturer, is non-injurious to hog bristle or nylon, setting compound, or painters' hands, and is designed to remove hardened paint down to the heel of the brush.

Being a concenrate, fast results are said to be assured in using Devoe Brush Shampoo, which can also be reduced with equal parts of water if desired. An outstanding advantage claimed for the product is that brushes cleaned with the shampoo can be rinsed under a faucet without staining the sink or wash basin. The cleaner is available in pint size containers.

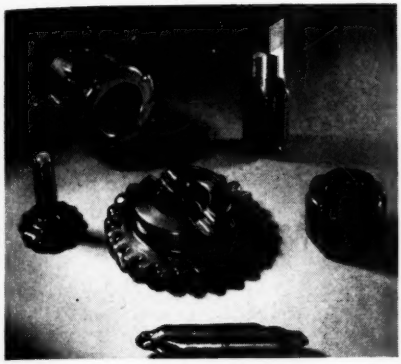
Rust-Oleum R-9 Rust Preventive

Designed to provide all-weather protection against rust to journals, castings, driving rods, machined surfaces, and finished parts, a liquid rust preventive designated at R-9 has been introduced by Rust-Oleum, Box 110-CD, Evanston, Ill. The product is described as an easy-to-apply and easy-to-remove rust preventive that is particularly designed to safeguard highly finished surfaces against rusting when in storage—indoors as well as outdoors.

Readily applicable with a brush, Rust-Oleum R-9 Rust Preventive, according to the manufacturer, dries within 72 hours after application, will not rub off, can be wiped clean with gasoline, mineral spirits or with any solvent even in temperatures as low as 30 deg. below zero, and is nontoxic to abrasions or cuts on the hands. The coating formed by the material on application is said to be tough and pliant and to exclude moisture for extended periods. R-9 is available in 5-gallon cans and 55-gallon drums.

"Seal-Peel" Coating

A plastic packaging and protective coating for production packaging and toolrooms, to be known as "Seal-Peel," is now being marketed by Seal-Peel, Inc., 903 Hammond Bldg., Detroit 26, Mich. According to the manufacturer, the material can be easily applied to tools,



Products to which Seal-Peel plastic has been applied

gages, mechanical metal devices, specialized items, and so on, providing protection against rust and corrosion, condensation, chipping or scratching, moisture penetration, rough handling, tampering, and the elements. It is claimed to remain soft and pliable for years, never becoming brittle and can be easily removed by simply slitting the protective coating with the fingernail or with a sharp instrument.

Seal-Peel is described as non-toxic, economical, safe, transparent, clean and easy to work with, free of obnoxious odors, and non-explosive. The thin transparent coating afforded by Seal-Peel is said to withstand pressures up to 600 lb. per square inch and to be unaffected by temperatures ranging from 120 deg. below zero to 160 deg. above. Moreover, it is claimed to be non-conductive and impervious to salt spray and acids.

Supplied in small solid blocks, Seal-Peel is melted in electrically heated pots or vats and the materials to be coated are dipped by hand or mechanical means, depending upon the quantities involved. The plastic coating is said to dry instantly upon removal of the parts from the vats.

"THE SIMPLICITY ANODE"

A heavy cast anode for chromium plating that provides:

1. Ample cross section for Conductivity.
2. A novel design that provides considerable edge length and provision for solution circulation.
3. A heavy hook that makes positive screw contact and which can be used over and over again.

Write for further information to

METALLURGICAL PRODUCTS CO.

35TH AND MOORE STREETS PHILADELPHIA 45, PA.

Established 1909

Manufacturers of Copper-Brass-Lead Anodes

PRODUCTION ***HIGH SPEED CENTERLESS FEED TYPE A POLISHING MACHINE***

A better finish at a lower cost and unskilled labor is one of the outstanding features offered by the PRODUCTION POLISHING MACHINES. Small articles in cylindrical forms may be fed automatically without centering, chucking or holding by using hopper fixtures. Has an unlimited range of work on metals, fiber, rubber, wood, etc. Write for further details.

PRODUCTION MACHINE CO. • **GREENFIELD, MASS.**

Staynew Radial Fin Sump Type Liquid Filter

Designed to solve difficult liquid filtration problems, a radial fin sump type liquid filter has been added to the line of Staynew filters marketed by the Dollinger Corp., 53 Centre Park, Rochester 3, N. Y. Compactly constructed, the filter is said to be ideal for use wherever liquids are collected, filtered, and recirculated.

Staynew Radial Fin Sump Type Liquid Filter

Designed to protect pumps by providing clean liquid at the point of use, the Staynew Sump Type Liquid Filter includes a radial fin insert which is said to provide a maximum effective filtering area in a minimum space and which can be quickly removed from the line by unscrewing one wing nut. The design of the filter also includes a slip-on insert cover. A wide selection of filter media is available to suit varied conditions, most filter media being cleanable.

Enthone Emulsion Cleaner EC-75

Enthone, Inc., 442 Elm St., New Haven, Conn., has developed an emulsifiable solvent cleaner designated as Enthone Emulsion Cleaner EC-75. The product is recommended for the removal of oil, buffing compounds, and other organic dirt, as well as solid dirt, from all types of metals, including active metals such as zinc, aluminum, brass, and nickel silver. One of the outstanding advantages claimed for the product is that it will not harm alkali cleaners when it is dragged into them but actually increases the cleaning ability of such cleaners.

Enthone Emulsion Cleaner EC-75 is used undiluted and is described as a penetrating solvent having high detergency and emulsifiability. Additional advantages claimed for the product are that it is self-dispersing and rinses off quickly; is safe for aluminum, copper, brass, zinc, iron, and magnesium; cleans steel fast, with alkali cleaning eliminated for phosphate treatments, blackening, or organic finishing; requires no heating facilities; lasts unusually long, and is not spoiled by oil contamination.

Midget Work-Holding Spinner No. 221M

Maximum speed and uniform results in polishing and buffing small round, cylindrical, and flat circular parts are said to be obtained through the use of the Midget Work-Holding Spinner No. 221M illustrated herewith, product of The Manderscheid Co., 810 Fulton St., Chicago 7, Illinois.

Measuring 7 inches long and weighing 6 ounces, the spinner is designed to provide for quick and uniform polishing of small parts, such as jewelry, fountain pens, and so on, with minimum operator fatigue. The housing is fully enclosed to exclude dust and grit from the interior

Midget Work-Holding Spinner No. 221M

of the unit. The one-piece shaft and brake assembly operates in grease-packed and sealed ball bearings, which are mounted in precision-machined seats and protected from dust and grit by housing closures. The shaft extension is ¼ inch in diameter x 1 inch long and is machined flat on one side for holding the fixture with an Allen screw.

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

"Tiz-Nu" Brushless Auto Paint

A brushless auto paint to be known as "Tiz-Nu" has been placed on the market by the Tiz-Nu Corp., 673 S. Coronado Ave., Los Angeles 5, Calif. According to the manufacturer, the paint can be readily applied by inexperienced workers to any automobile body with the aid of a piece of cheesecloth.

The paint dries in one hour to flint-like hard finish that cannot peel, crack, or crumble, and can be waxed or polished if desired, it is claimed.

Edmont Palm Coated Work Glove

A knit wrist style work glove having the palm and fingers coated with Neoprene to provide for extra long wear and resist water, oil, and other liquids is now being marketed by the Edmont Manufacturing Co., 509 Orange St., Coshocton, Ohio. The back of the glove consists of uncoated tan canton flannel to permit free ventilation and make the glove more comfortable and flexible during wearing.

Edmont Palm Coated Work Gloves

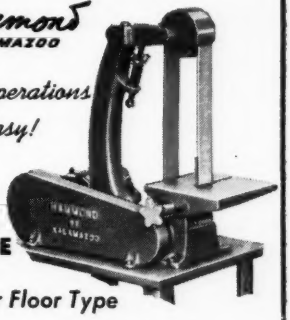
The Edmont Palm Coated Work Glove is claimed to be ideal for handling wet or moist objects, as well as abrasive materials such as stone, lime, and cement. It is said to be an all-around work glove for rough abrasive work, wet or dry.

Cooper Electro Plater

A plating unit especially designed for the small manufacturing plant and service shop to be known as the Cooper Electro Plater, is announced by the D. C. Cooper Co., 1467 S. Michigan Ave., Chi-

Hammond of KALAMAZOO

"101" Operations Made Easy!

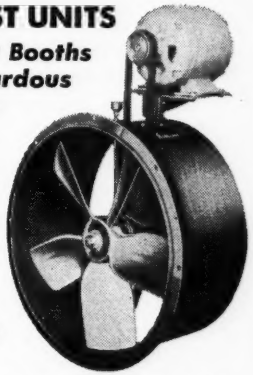


Model F-2 FLEXIBLE BELT
Bench or Floor Type

Grinding, Polishing, Deburring, Chamfering on irregular or regular shaped parts, also eliminate costly hand filing operations!

Hammond Machinery Builders INC.
1622 Douglas Avenue • Kalamazoo 54, Michigan

EXHAUST UNITS
for Spray Booths and Hazardous Locations



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Also Manufacturers of a complete line of waterwash and dry type paint spray booths with accessories. Send for details.

M. & E. Manufacturing Co.
2571 Winthrop Ave.
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Cooper Electro Plater

cago 5, Ill. Useful in performing cadmium and other plating operations, the unit is completely self-contained and can be efficiently employed by unskilled operators.

The design includes a circuit of transformers and copper oxide rectifiers which converts 110-volt alternating line current to 6-volt direct current that is applied to cadmium anodes through a heavy copper bus and cable. Anodes are suspended from conveniently demountable holders in a welded steel tank measuring 12 inches wide x 24 inches long x 15 inches deep.

Parts being plated are hung in the plating solution from hooks suspended from crosspieces carefully designed for maximum contact surface and freely movable along the length of the tank by virtue of unique sliding contacts. Current ranging from 0 to 30 amperes is read from a large ammeter dial and controlled by a tap switch, both of which are mounted together with the main toggle switch on a panel built into the face of the unit. Rectifiers, transformers, ammeter, switches, and other electrical components are of high quality and are carefully designed within a sturdy all-welded steel frame.

The Cooper Electro Plater requires a floor space of 25 x 25 inches and measures 36 inches high overall. Designed to draw from 2 to 30 amperes when in operation, the unit requires no installation other than plugging the line cord into a 110-volt a. c. outlet.

"Lektromesh"

The C.O. Jelliff Mfg. Corp., 124 Pequot Rd., Southport, Conn., announces the availability of "Lektromesh" to industrial users of metal screening and filter cloth. A one-piece solid metal product with no woven or other foundation structure, Lektromesh cannot ravel and is extremely resistant to tearing, the manufacturer states. Hole diameters are claimed to be extremely accurate, and the screen is said to present a smooth surface finish equal to that of perforated mesh.

Stiff, strong and wear-resistant, Lektromesh can be readily fabricated by drawing, stamping, welding, soldering, and other secondary operations. A wide variety of mesh patterns can be produced in various metals. Meshes produced vary from 40 to 400 mesh.

AO Face Shield

A shield which is designed to provide overall face protection in chemical handling and other operations is announced by the American Optical Co., Southbridge, Mass. The shield is also said to provide protection against the impact of flying particles and splashes of acids, oils, alkalis, hot water, and so on.

The extra large window, which measures 18¾ x 10 inches, is made from 0.040-inch thick cellulose acetate and is constructed to extend completely around the face, even covering the ears. A fiber headguard protects the upper forehead

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2-5816

AO Face Shield

and covers the entire top of the head as an additional safeguard against injury.

The headgear is made for comfort and long wear. The band slides within a fiber sleeve in back, thus permitting easy adjustment to varying head sizes. A metal knob allows for quick adjustment. In front, the headgear is provided with a genuine leather sweatband to absorb perspiration. Positive friction joints are said to hold the window firmly in an "on" or "off" guard position.

Anti-Fouling Paint

A paint which is designed to protect the bottoms of ships from barnacle infestation and eliminate the necessity of frequent dry docking to remove barnacles and other marine growth has been developed by the Battelle Memorial Institute, Columbus, Ohio, and is now being manufactured by the Amercoat Division, American Pipe & Construction Co., P. O. Box 3428, Terminal Annex, Los Angeles 54, Calif. The effectiveness of the paint is said to be due to metallic copper which, in combination with other ingredients, renders the painted ship hull poisonous to marine-life attack.

According to the manufacturer, the paint has proved effective in preventing barnacle infestation in fouling water for as long as two years and may be used over either metal or wood, providing equally effective protection in both cases.

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Strips Copper

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No dangerous fumes
No trouble

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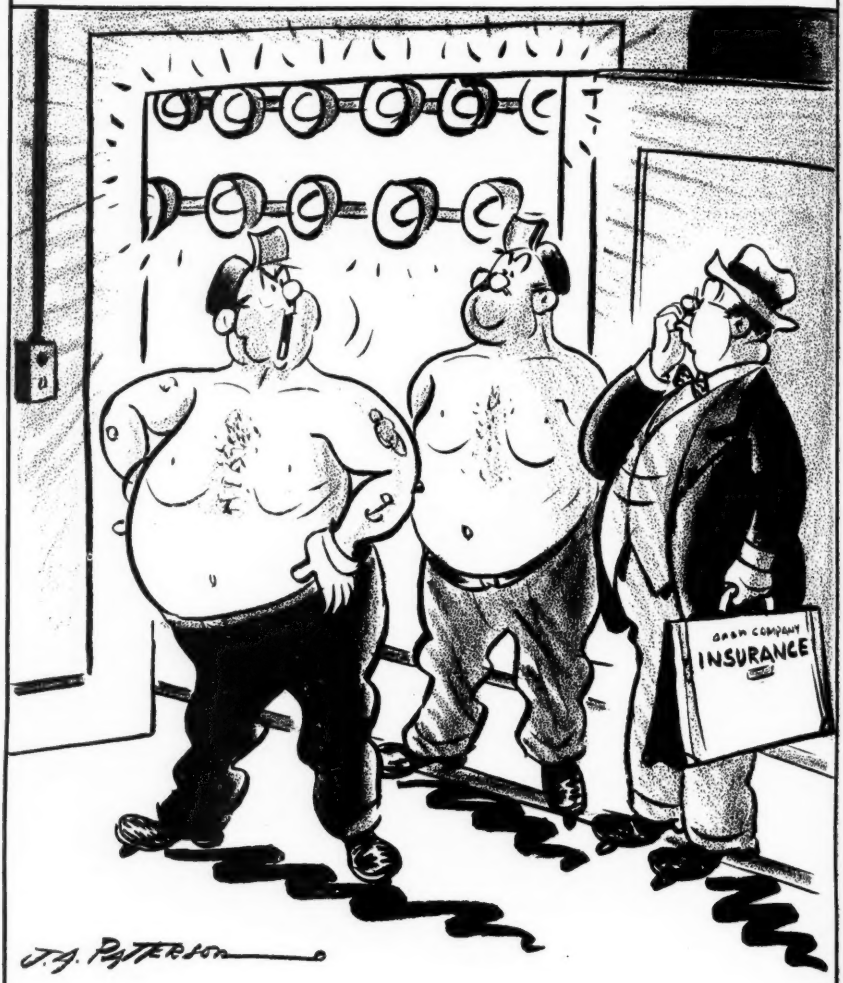
The Finishing Touch **By J. A. Patterson**



"What difference should it make to him how well we're covered?"